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23rd Annual Session
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September 6, 7, 8, 9, 1944

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Volume XXV AUGUST, 1944 No. 8

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THE FUTURE DEVELOPMENT OF PHYSICAL MEDICINE *

GEORGE MORRIS PIERSOL, M.D.

Director of the Center for Instruction and Research in Physical Medicine at the University of Pennsylvania

PHILADELPHIA

It is unnecessary to stress here the fundamental importance of physical medicine or to point out the ever increasing application of its technics not only to the treatment of many diseases but for diagnosis. Even a cursory survey of the subject makes it apparent that in fields of industrial medicine, geriatics, arthritis, diseases of blood vessels, diseases of the nervous system, including infantile paralysis, as well as in problems of rehabilitation, physical medicine is destined to play an outstanding role.

To those who have the welfare and progress of physical medicine at heart it is encouraging to observe the recent upsurge of interest in this field. Little by little the possibilities and values of physical medicine are being better understood. The stupendous rehabilitation program on which this nation has embarked is responsible in no small measure for growing enthusiasm in this field. Already thousands of disabled members of our armed forces are reaching our shores to be cared for in service hospitals and ultimately to crowd our Veterans Administration facilities. If the rehabilitation post-war program is to succeed, physical medicine and its close ally, occupational therapy, must be prepared to face a real challenge. It is time, therefore, that we prepare to meet these obligations so that, when called on, we will furnish adequate and effective physical medicine built on a firm scientific foundation.

In the minds of the public generally and of physicians in particular, does physical medicine have the dignity and position to which it is entitled? If we examine this question open-mindedly and honestly, we are forced to admit that many persons, and certainly the majority of physicians in this country, fail utterly to appreciate the possibilities of physical medicine and are even loath to accord it just recognition. The attitude of the medical profession toward physical methods of treatment, if we exclude the use of roentgen rays and radium, has brought about an unfortunate situation. The result of this has been the loss of this important field of therapeutics to a considerable extent to legitimate medicine. The widespread indifference of physicians has allowed this branch of practice to be considerably dominated and sometimes even exploited by various groups advocating special cults and schools of therapy.

There are a number of reasons for the woeful lack of understanding and the apathy toward physical medicine that exists today among far too many members of the medical profession. These reasons are: 1. Inadequate teaching, or entire lack of teaching, of this subject in the medical schools, both undergraduate and graduate. 2. A similar lack of interest in this field in the training of interns and residents. As a consequence, physicians enter the practice of medicine almost entirely unfamiliar with even the basic principles of this branch of therapeutics. 3. An inherent lack of interest in this subject which renders practicing physicians generally unwilling to expend the time and money necessary to acquire a working knowledge of even the

* Read before the Pennsylvania Academy of Physical Medicine at Philadelphia, April 20, 1944.

simpler forms of physical therapy. Unfamiliarity with the subject likewise impels those who are teaching medicine to pass lightly over this branch of therapy rather than to emphasize its importance to their students. 4. The reluctance of physicians as a group to adopt time-consuming forms of therapy, particularly if they require mechanical skill and physical effort. As a result of this, too many physicians have drifted into the habit of delegating to others the prescribing and carrying out of physical therapeutic measures. 5. A misconception on the part of physicians generally that physical medicine can be practiced only with the aid of elaborate, intricate and expensive paraphernalia. They have entirely lost sight of the fact that effective physical therapy can be carried out in the office and even in the home without the aid of complicated apparatus. 6. The fact that physical medicine has been and is being so widely practiced by nonmedical persons makes many orthodox physicians shrink from engaging in it lest they incur unfavorable criticism.

Furthermore, physicians exhibit a certain indifference because exact information about the effects of the various physical agents is still too meager and often too uncertain. Many forms of treatment, as successful as they seem to be, are based on imperfectly understood physiologic effects and are largely empiric. The present status of physical medicine has been compared to an inverted pyramid precariously balanced on an apex of sound scientific facts and spreading out into a broad, top-heavy base of empiric practice. For these reasons physicians have shown less interest in physical medicine than has the lay public. The former have been prone to turn a deaf ear to the latter's rising demand for this type of therapy. As a consequence patients have been forced to turn from their physicians to other sources for this form of treatment. If physical medicine is to come into its own, if it is to be prepared to meet the demands that are rightly being made on it, a whole-hearted effort must be made by those interested in physical medicine and by those charged with the training of physicians and with the development of scientific medicine to remedy this unfortunate state of affairs. In an effort to correct this situation several approaches have been suggested; these fall under three main heads: (1) education, (2) research and (3) publicity.

Education

A concerted attempt should be made to introduce into the undergraduate curriculum adequate instruction both didactic and practical to the end that medical students will receive a training in at least the fundamentals of physical medicine. They should learn how and when to prescribe the various procedures which constitute physical therapy. They should be impressed with the fact that treatment by physical means is as much a therapeutic problem as any other form of treatment, to be prescribed and supervised with the same care and precision that is exercised in the case of drug therapy or other therapeutic steps with which they are more familiar. An effort should be made to enlist the interest and cooperation of the deans of the various medical schools and the Council on Medical Education of the American Medical Association, as well as the Association of American Medical Colleges. At the moment, with the accelerated courses in medicine already overcrowding the students, it will doubtless be difficult to persuade educators to allot more time to a subject which has been so much neglected as physical medicine. Nevertheless, patient and persistent effort will in the end bear fruit.

Education in physical medicine should not cease with graduation from the medical schools; it should be carried into the hospitals so that interns

and residents may be made acutely aware of the existence of departments of physical medicine. Visiting physicians could do much along this line by availing themselves more often of the facilities for physical therapy and insisting that their junior associates and interns observe the way treatments by physical methods are carried out and familiarize themselves with the various technics, their indications and their contraindications. In institutions where the department of physical therapy is in charge of lay technicians, the physicians, including the interns, should be sufficiently well informed to be able to prescribe the specific type of treatment desired and not casually place this responsibility on the shoulders of lay persons, who, however skilled they may be, should not be asked to assume the responsibility for prescribing treatment. The situation is somewhat different when a department is under the supervision of a trained physician. The referring physician should then confer with the physician in charge of physical therapy and be governed for the most part by his better judgment and advice in matters of technical procedure.

Physical medicine should no longer be neglected in the graduate schools. An adequate course should be incorporated in the curricula designed for graduate students in orthopedic surgery, neurology, medicine and even general surgery. A still more important step is to establish in the graduate schools basic courses in physical medicine for qualified graduate physicians, as is now done for various other specialties. These courses should be carefully thought out so that they will include the basic sciences as well as a thorough grounding in the technics of physical medicine. They should be in every way practical. The students should be given an opportunity to handle patients and to learn at first hand how to give the various treatments properly. Graduate students successfully completing the one year basic course should be encouraged to continue their studies for one or two years in order to qualify for a degree of master or doctor of medical science in physical medicine. The complete courses of two or three years could be arranged by creating fellowships in physical medicine. Before receiving a degree, fellows could be required to submit a satisfactory thesis based on original work in some field of physical medicine. It would be advantageous to have an interchange of fellows between the various departments of the hospitals or graduate school. For example, fellows in physical medicine at some time during their two year course should spend two or three months continuously in the neurologic service, the orthopedic service, the service for peripheral vascular disease, etc. On the other hand, fellows in these departments should be required to spend several months in the department of physical medicine. Such a plan would do much to broaden the outlook of graduate students and to create in each of them a better understanding of the problems with which they and their associates are concerned. A plan such as that suggested is actually in operation at the Mayo Clinic, where the results have been most gratifying. The success of such a program in graduate education depends primarily on the arousing of physicians to an interest in physical medicine so that they will come to look on it as a well recognized specialty that merits their time and their efforts as much as do the better established specialties. Physicians so trained would be in a position to establish and direct departments and courses in physical therapy in other institutions. Thus, in a few years there would be developed a group of scientifically trained and thoroughly competent physicians versed in physical medicine. If such a group were available today, medical schools and other institutions could not offer as an excuse for delaying the establishment of courses in physical medicine their inability to obtain trained men.

One of the crying needs of the hour is an adequate group of well trained physicians both interested and skilled in this field of practice.

Efforts should not be limited to the training of physicians in physical medicine. Continued interest must be directed toward the extension and improvement of courses for physical therapy technicians. In this field, the present demand far exceeds the available supply. In spite of accelerated courses and various expedients fostered by the government, Army and Navy as well as civilian hospitals are still in urgent need of properly trained, qualified technicians. Under the guidance of the Council of Physical Medicine of the American Medical Association and a certain number of state boards of licensure and practice, technicians' courses have distinctly improved in recent years. These courses need to be strengthened by the introduction of more basic science and more purely cultural subjects. In all probability they require lengthening. The well trained technician should bring to his or her work not only highly developed technical skill in physical medicine but something of the attitude of a trained psychologist, a social service worker and an occupational therapist.

Before leaving the subject of education a word should be said about the close relationship that should and does exist between physical medicine and occupational therapy. These two forms of therapeutics supplement each other. Those skilled in one should have an intimate appreciation and knowledge of the other. The present division between these two subjects is largely artificial and should be gradually eliminated. It is the consensus that in a properly organized institution the head of the department of physical medicine, who should be a specially trained physician, should also exercise supervision over the department of occupational therapy. In an ideal organization medically controlled physical therapy should be aided by regulated occupational therapy. Thus many corrective steps not only can be rendered less laborious and more interesting to the patients but can in many instances actually develop skill along productive lines. Those who are concerned with the great rehabilitation program fortunately are alive to the importance of correlating suitable occupational therapy with physical medicine.

Research

The importance of an educational program such as that outlined is overshadowed by the necessity for well conducted and coordinated basic research in the field of physical medicine. Sound research in physical medicine presents many difficulties, not the least of which, as Karsner and Goldblatt have pointed out, is that, "the success or failure of any form of therapy in medicine must be gauged in its final analysis by its action on living patients." The proper evaluation of the methods of physical medicine cannot depend on the mere opinions of physicians or the subjective reactions of patients. It must rest on controlled objective examination by investigators who approach the subject without preconceived ideas or prejudice. In spite of many sporadic efforts in the past, it must be admitted that at present exact information about the effects of the various physical agents used in physical therapy is much too meager and uncertain. Much basic data must be accumulated if physical medicine is to be placed on the sound scientific basis that characterizes other fields of therapeutics. It has often been emphasized that the effects of physical therapy must be determined largely by experiments carried out on human beings. Such experiments must be set up with the care and forethought necessary to the success of any scientific undertaking, and the results must be subjected to rigid control. Furthermore, the psychic factor, which may be of little significance in animal experimen-

tation, looms large in all experiments with human beings and must be rigidly excluded.

It is no easy task to outline specific research problems casually. Numerous lines of investigation that should yield profitable results come to mind. The basic physiology on which many of the simpler forms of physical therapy depend for their results, for example massage and the application of various forms of heat, all deserve further elucidation. A useful field for investigation is presented by that ill defined and vaguely understood group of periarticular and muscular conditions variously referred to by such terms as myositis, fibrositis and even bursitis, all of which form no inconsiderable part of the material which passes through a department of physical medicine. In spite of the vast amount of money and effort that has been devoted to the study of the arthritides, too many aspects of this greatest of all groups of disabling diseases still await solution. Much work is yet to be done on peripheral vascular disease, and even poliomyelitis, which occupies such a prominent place in the popular imagination, still presents numerous aspects that are in need of solution. A group of physicians such as those who comprise the American Congress of Physical Therapy, with their broad experience with the conditions that commonly come under the observation of those interested in physical therapy, coupled with their intimate knowledge of the various technics, are in a position to suggest many profitable lines of investigation and to render valuable aid in the conduct of both clinical and basic research. Any one charged with the responsibility of initiating and directing such investigations will welcome constructive criticism and suggestions. Effective research in physical medicine cannot be conducted by any single group. Its ultimate success will depend on the effectiveness of a coordinated effort between clinicians, trained technicians and investigators in the field of basic medical sciences.

Publicity

The success of every forward looking movement depends in part on the dissemination of appropriate information. To accomplish this and maintain at the same time both scientific accuracy and dignified good taste requires the supervision and direction of some central agency. Ill considered and often lurid publications based on uncontrolled clinical observations and impressions, especially when they appear in the public press or in lay journals, fall far short of the desired mark. As with all advances in medicine, the proper approach is through physicians themselves. Those interested in this subject should be stimulated to present thoughtfully prepared data dealing with the various aspects of physical medicine, scientific, experimental and clinical, to their professional colleagues in medical journals and before suitable medical gatherings. The all too few journals dealing with physical medicine should be adequately subsidized so that they can be improved and expanded. There should be a closer organization among those interested in physical medicine in order to promote a freer discussion and interchange of ideas concerning the problems which confront them. Other desirable methods of publicity that have been suggested are the establishment of a library of moving picture films dealing with the various aspects of physical and occupational therapy and the organization of trained men who would be willing to go to the various medical centers and hospitals throughout the country in an effort to stimulate a wholesome interest in physical medicine.

A program such as that outlined is admittedly a large undertaking. It will require much money, hard work and time for its accomplishment. A

few years ago such an ambitious program would have been doomed to failure from the start. Today, thanks to the interest that physical medicine has aroused, a number of agencies have expressed their willingness to implement such a movement. Its realization becomes now not only a possibility but a probability. The first group to appreciate the importance of physical medicine was the American Medical Association, which, through its Council on Physical Medicine, has for years fostered and directed progress along the lines suggested. The National Foundation for Infantile Paralysis, under the inspiring and energetic direction of Mr. Basil O'Connor, until recently devoted most of its efforts to the study and treatment of infantile paralysis. Now this group, realizing that infantile parlaysis represents but one of the problems involved in physical medicine, has widened its scope to include physical medicine in its broadest sense. A concrete evidence of this attitude is the recent grant made to the University of Pennsylvania for the establishment of the first center for research and instruction in physical medicine. That department is now in the process of development. Its purpose and objectives are to initiate and develop a program based on the principles above discussed. The latest evidence of national interest in physical medicine has been the establishment of the Baruch Committee, which for months carried on a nation-wide investigation into all aspects of physical medicine. As a result of the deliberations and conclusions of that committee, Mr. Baruch made possible the establishment of more centers for research and instruction in physical medicine. Within a short time there will exist in this country probably six or seven such centers. These are properly being established in great universities, where not only are hospital and clinical facilities available but the help and cooperation of the various basic science groups can readily be obtained. In view of such coordinated effort, both clinical and investigative, it is not too much to predict that the future will see many of the problems and technics in physical medicine established on a sound, scientific basis. At the same time an ever growing group of well trained physicians versed in physical therapy will be developed in this country to the end that one of the oldest and most important fields of therapy will grow in usefulness and influence and receive the long delayed recognition to which it is entitled.

ANNUAL BUSINESS SESSIONS OF CONGRESS

There will be two scheduled business sessions for members of the Congress. The first session will convene at 9 P. M., Tuesday, September 5, in the Lattice Room, Hotel Statler, Cleveland, Ohio.

The second session will meet at 5 P. M., Wednesday, September 6, Grand Ball Room, Hotel Statler.

TREATMENT OF BRONCHIAL ASTHMA BY INTENSIVE BREATHING THERAPY

H. I. WEISER, M.D.

TEL AVIV, PALESTINE

Reviewing the abundant literature on the treatment of bronchial asthma, I found that breathing therapy had been described as a supplement to medicinal or physical therapy, but not as the sole therapy.

The lack of success of the usual therapeutic methods induced me to treat some of my asthmatic patients, who had previously been treated unsuccessfully, by breathing therapy alone, without medicinal or physical therapy.

All the methods used are aimed at prolonging the expiration, as opposed to the inspiration, time. Hofbauer[1] has recommended breathing exercises with mechanical bells to record the length of inspiration and expiration. He also has advised the use of humming exercises and special attention to the muscular apparatus of the abdomen. Saenger[2] regulates the rhythm between inspiration and expiration by counting aloud and by intoning the vowels. Kirchberg[3] and Ylpoe concentrate on relieving the rigidity of the thorax observed even in children suffering from asthma or rickets. Besides intensive massage, these authors recommend a forceful, rhythmic pressing of the thorax, with loud expirations.

Hofbauer and Kirchberg advocate gymnastic exercises related to physiologic changes in the breathing mechanism.

All of these authors maintain that deep-breathing exercises increase expectoration, strengthen the respiratory muscles and result in a habit of breathing deeply and rationally.

Patients Studied

The children studied were of that group of asthmatics who, in addition to having frequent attacks involving the mucous membranes, show symptoms denoting a highly sensitive nervous system.[4-5] The nervous factor in most of the children was so prominent that they suffered attacks in connection with excitement such as enrolment in the first grade, the first visit to kindergarten, domestic differences between the parents and quarrels with brothers and sisters, particularly if the asthmatic child was the second child among several others. The irritability of these children was also intensified by measures which called attention to the sickness, such as frequent visits to the doctor, whom they saw manipulate instruments and administer injections; a change of diet, and other restrictions interfering with normal child life.

All of the children were intelligent and ambitious above the average. However, their frequent absences from school caused by illness had a depressing influence on their minds. They were often sulky and moody before the treatment. Occasionally, shortly before and after an attack they were frightened and sad. Family life was made disagreeable by the presence of a chronically sick child. The parents' dread of an attack was frequently greater than the child's. A slight cold or an occasional cough brought an expression of dread to the faces of the parents. There were outbrusts of despair in the presence of the physician after each fruitless therapeutic measure.

In the adult patients, too, the nervous factor was greatly accentuated by the agony of the attacks and the dread of their return. The adults, like the youngsters, were afraid even to laugh, for laughing, like coughing, owing to their spastic technic of respiration, brought them close to an attack.

Most of the children were thin and asthenic, with a faulty posture in the form of kyphosis or scoliosis. Some of them were mouth breathers. The thoracic muscles were poorly developed. All the children were poor in gymnastics and tired quickly when playing with healthy children of the same age.

The adults were nearly all limp, thin and pale. Their behavior, especially their timidity, betrayed considerable nervousness. An occasional female patient had strikingly large, bright eyes. The thorax might be paralytic; the muscles of the shoulder girdle were poorly developed, and the respiration, even between attacks, was shallow and spastic, with forced expiration. The thoracic extension during respiration was restricted to 0.5 to 2 cm., instead of being at least 5 to 6 cm. The vital capacity was far below the average. The physical capacity was even more diminished in the adults than in the children.

Technic

The purpose of treatment by exercise is correction of the physical and psychologic changes caused by frequent attacks. Those changes, with other factors, such as allergy and other constitutional factors, maintain and augment the expectation of an attack. Physically, the treatment is designed to render more elastic the often rigid thorax of the asthmatic patient. The weak muscles, especially the respiratory muscles, must be developed and strengthened. In addition it is aimed at preventing or alleviating chronic bronchitis and the effect of the asthma on the lungs (emphysema) and the heart (myocardial weakness). Psychologically, the main goal is to ease and to regulate a spastic respiration. Also, self confidence should be strengthened and restored by the development of physical fitness and courage.

I found the respiratory methods described by Kirchberg, Hofbauer, Ylpoe and Saenger insufficient unless they were supplemented by medication. An intensified therapy comprising breathing gymnastics proved necessary.

The treatment starts with energetic massage of the back and the chest. The massage consists mainly of deep kneading and clapping; this is continued until there is a distinct cutaneous reaction. It was difficult to produce this reaction at first; later on, with improvement of the general condition, it was much easier. Between attacks, juvenile patients are massaged while lying down; older patients are massaged, as a rule, in a sitting position. At the beginning of an attack of dyspnea, children also are massaged while sitting up. At this stage, massage is prolonged, with clapping of the sides of the chest preferred. The trapezius muscle, already painful when dyspnea is beginning, is not to be kneaded but is to be treated only by careful stroking.

Manual compressions of the thorax carried out rhythmically follow the massage. These are accompanied by long expirations. With children, the compressions are carried out from the sides with the patient lying on the abdomen or the back. With adults, a side posture is preferred and a hard cushion is placed under one side of the thorax at the level of the mammilla. During an attack, however, or if there is emphysema, the patient sits, and the compressions are done from both sides. This is very strenuous for the masseur. Therefore, one should have the patient sit so that he is leaning sideways against a wall with a hard cushion between the wall and the

thorax. One should then exert pressure with both hands from the free side of the thorax. When an attack is beginning or is in progress, frequent compressions, correctly timed with the expirations, are carried out.

For audible expirations I use humming (Hofbauer). I do not use the counting method (Saenger), but I make the patient count as long as possible during one breath (without exertion) in order to stimulate his interest. I have in mind the same purpose while loudly counting and noting, by means of a stopwatch, the number of sounding expirations. The patient learns to time the expiration himself. With children, no accurate regulation of the abdominal breathing is stressed. Adults learn after several "gymnastic" lessons how to use their abdominal pressure apparatus while breathing. According to my experience, the training necessary for abdominal respiration is always confusing to children suffering from asthma, while adults are confused only at first. A further exercise of respiration against resistance, such as humming, is performed with the spirometer, and the cylinder which is to be raised is charged with different weights. First, the vital capacity is measured with the uncharged spirometer; the figure is read and recorded by the patient himself

The balance of the therapy takes the form of respiration gymnastics.

Each movement, gymnastic, sporting or ordinary (for instance, climbing stairs), is accompanied by intoned expiration, in order to avoid pressure while using strength. This is true also of the exercises of relaxation. The inspiration is performed before or after the movement. No further attention is paid to it. This principle must be followed even though the requirements of the exercise do not conform to the physiologic posture of breathing.

The dose is an individual factor. It depends on an examination of the circulation and on the relative amount of vital capacity. The latter must be measured before each treatment. The dose depends also on the degree of a possible bronchitis and on the temperament of the patient. Other factors are season, temperature and previous physical and mental strain. The dose is gaged by watching respiration, facial color and the psychologic reaction of the patient. The vital capacity is satisfactory if it is about 50 to 100 cc. higher after "gymnastics" than before and if the patient feels fit.

Gymnastics in the period between attacks must be lively and stimulating. Special care should be given to strengthening of the shoulders, the back and the abdominal muscles.

The "gymnastic hour" should last from twenty-five to forty minutes. During the first month of treatment patients take the exercises alone; later on they work together in small groups. The treatments should cover a period of at least a year.

After a strenuous exercise a short recess is indicated, the patient lying on the back with knees flexed and hands lying half sideways, palms down. During this intermission, thoracic compressions and sounding respirations, preferably counting, are done. When the rest number (highest number counted in one breath) is reached, gymnastics are resumed. The amount and intensity of work between the pauses must be progressively diminished toward the end of the lesson, while pauses must become more frequent. The treatment is finished after a pause of at least ten minutes; finally, back massage and a reading of the vital capacity are indicated. It is important for the patient to register and note for himself the increase in working capacity, as shown by the reading of the spirometer, the number of times he can chin himself, the number of strokes he can perform with the automatic oar, etc.

The exercises must be varied and must be adapted to the age level in order to keep the interest alive, a factor essential to successful treatment and good physical training. They consist of calisthenics, boxing, jujutsu, gymnastics with apparatus and baseball. Posture exercises are done frequently. Gymnastics for infants consist of play with balls and rods and funny resistance games. Courage training (climbing up and running on a sharply sloping board, swinging on a trapeze, climbing over a horizontal ladder) is increased in intensity gradually. From the eighth year, every male asthmatic patient should learn to box, the boxing period being controlled and the respiration regulated. As soon as the small patient knows how to defend himself against his comrades, his courage and self confidence grow, even though he has been the weakest in his grade. The adult who at the beginning of treatment has complained of a lack of spirit, soon feels his growing skill in boxing and acquires a feeling of vigor and joy. Courage-training exercises adapted to the age of the patient should supplement the boxing.

After about two months of training, once a week during gymnastics each patient is brought to the verge of dyspnea by rapidly succeeding exercises (for instance, by skipping rope or by a round of boxing). The result of the strain is not a dreaded attack, and each time the patient is surprised by the rapidity with which he can rid himself of a "breath-taking" situation by concentrating on prolonged expiration.

During an attack no gymnastics are carried out. By massage, compression of the thorax and concentration on prolonged expiration, it is often possible for the patient to "breathe off" the attack or at least to relieve it.

Faith in the success of the therapy is necessary. A thorough understanding of its purpose is essential. I have used the following simple test to win the patient's confidence in the therapy:

I ask the patient or one of his relatives to inflate a football. Even with the utmost effort he cannot do so successfully. Now I compare the inflated football to the alveoli in an asthmatic attack. In spite of the greatest effort, the patient's lungs (the respiration) do not inflate the ball or the alveoli, satisfactorily. What does the asthmatic patient do during an attack? He gasps for air helplessly, since he cannot inflate his alveoli, which are already filled to capacity. He can blow fresh air into the already inflated football or into the inflated lungs only after he has lost the used-up air through an open valve or through his mouth, respectively. Thus the patient understands that not inspiration but only sufficient expiration relieves him during the time of suffocation. He understands now why his respiration has to be disciplined by exercise.

The frightened and desperate parents of asthmatic children, as well as the relatives of adult patients, need to be trained. They get exact orders, which they must pledge themselves to observe. Among other things, they are told that an attack is severe only in its reaction on the parents or other kin. During the treatment the relatives should be present in order to learn the method.

The following are some pertinent "general directions":

1. Through daily ablutions with water of room temperature, even during the attack of bronchitis, the body of the patient becomes inured and its power of resistance increases. The dread of the patient and of his family of the presumed ill effects of wet and cold must be overcome.

2. Humming exercises are carried out daily in the morning and in the evening with counting of their duration. The figures are recorded in a notebook, which is shown to the physician at the end of every month. At home the patient should sing

and whistle as much as possible. Children should blow soap bubbles, play the mouth organ and so on.

3. Daily exercises are carried out in the morning and in the evening according to direction, and the expiration element is stressed. In order to make home gymnastics interesting, I have them done with chairs, tables, stools, brooms, etc., as a substitute for gymnasium apparatus.

4. On the way to school or to the office, walking respiration exercises are done: for instance, six to twelve steps are taken during expiration and two steps during inspiration.

5. It is pointed out to the patient that coughing, especially dry coughing is a bad habit. Continuous coughing tends to provoke an attack and should be avoided. The following measures help: (*a*) fast and short inspiration and expiration through the nose, (*b*) continuous inspiration and expiration with a hissing "F" sound, and (*c*) increasing the air pressure to prevent opening of the larynx.[6]

Respiration therapy must be supervised by a physician. A nurse or teacher of gymnastics can rarely exert the authority necessary to overcome the many obstacles which develop in the course of treatment. (Only rarely would she have enough influence to bring about continuation of therapy for months and years.)

The therapy requires on the part of the physician good training in gymnastics, boxing, fencing and jujutsu, besides pedagogic ability and experience with young and adult asthmatic patients. It further requires tactful determination at the proper moment and, especially, a hopeful outlook.

Comment

Massage. — The massage of the chest intensifies the patient's respiratory movements, increasing his vital capacity by 50 to 250 cc. Subjective and objective relief occurs even during an attack, when the lung vessels are congested.[7] Bum sees massage as a nonspecific stimulating therapy acting through the release of waste products.

Compressions of the Thorax. — Compression of the thorax is necessary because the patient with chronic asthma, whether child or adult, shows inflation of the lungs and rigidity of the thorax (Engel,[8] Ylpoe and others). If this rigidity of the thorax is not successfully overcome, "It will result in decreased life expectancy and in reduced working capacity" (Engel). With children the thorax can be relaxed if sufficient patience and determination are brought to bear. With adults the relaxation is a relatively distinctive feature. In my experience the respiratory extensions of children were doubled or tripled after a two month treatment; with adults, an increase of 50 to 100 per cent was noticed.

Resounding Breathing Exercises. — Between attacks the purpose of these exercises is to call the attention of the patient to the length of his expirations and teach him how to regulate this. Expiration is carried out by elastic structures. According to Kirchberg, expiration exercises increase the influence of the cerebral cortex on the expiration muscles. Thus the expiration is controlled by will power. A further effect is a change from oral breathing to nasal breathing. The disadvantage of oral breathing consists in the inhaling of cold, dusty air into the lungs; also, the breathing becomes shallow because of the slight inspirational pulls. Mouth breathers have weak respiratory muscles and suffer frequently from "colds," and oral breathing reduces the resistance of the mucous membranes of the throat. The increased strength of the respiratory muscles due to breathing exercises performed against resistance is important. Examples of such exercises are humming and exercises with the spirometer. The most important thing is to collect the largest possible amount of air and to use it rationally.

During an asthmatic attack the spasm of the bronchial muscles decreases the pulmonary pressure. The involuntary groanings are defensive reactions,

just as are voluntary, long-sounding expirations, since such measures produce intrapulmonary pressure. By these means the circulation in the lungs, which has become congested during an attack, is relieved (Hochrein[7]).

Herbst[9] stated that the strength and frequency of the heart beat, which usually become reduced during an attack, remain normal with voluntary regulation of respiration.

A certain increase in the vital capacity and the chest circumference is important. The increase in the volume of air inspired is a stimulus for the desired expansion of the thorax and the enlargement of its breathing space (just as for the required strengthening of the respiratory muscles).

A gain in vital capacity is worth while only if it is acquired by a better technic of expiration. In judging the capacity of the respiratory apparatus, one should give less weight to the volume of air produced by one breath than to the way in which it is utilized. The degree of ventilation, i. e., the volume of air which the patient breathes in and out in one minute in a quiet state, while working and during recreation, furnishes a better measure of the breathing capacity. Both depth of breath and frequency of respiration change during the course of the treatment. The respirations diminish in frequency and become deeper. This change is brought about by intensive physical work and by many breathing exercises. The quiet respiration, maintained even during work by the trained patient, makes it possible for him to keep the oxygen debt at a safe level, and excludes the spastic type of frequent, shallow breathing as an attack promotor.

Intensity of training is more important to the outcome than amount of work. The stimulus created by the exercises must be stronger than the average provocation and should be followed by a corresponding rest period. It should not surpass the limits of normal adaptability. The effort should not result in overstrain, since the intensity of training is an important biologic stimulus whereas the latter is only detrimental. The quickly succeeding exercises, almost resulting in suffocation, bring about an increased ventilation and an intensive use of the respiratory muscles.

Ineffectual exercises, leading only to a pressed respiration, as advocated by lay gymnastic systems, should be strictly avoided. These exercises, as well as forced permanent strains, could lead to irreversible tension in the elastic tissues of the asthmatic patient's lungs, as a tendency toward emphysema is always present. A reaction on the heart by congestion of the circulation in the lungs could be brought about by detrimental exercises. Urbach's statement[10] that children never suffer an attack after an unregulated physical strain cannot be left undisputed. My experience with 3 asthmatic children proved otherwise. A boy 13 years old suffered several attacks in the gymnasium after he had undergone violent strain. I permitted 2 girls, 9½ and 8 years old, to take part in a normal, lively gymnastic hour without instructing them about voluntary regulation of respiration. A gymnastic teacher conducted the exercises. Each child reacted with a violent attack beginning shortly after the lesson. This agrees with the statement of Emslie[11] that an asthmatic patient exhibited symptoms of tetany after unregulated physical strain.

Intensified breathing therapy, unlike other types of therapy, attempts to compensate the psychologic and somatic components which bring about an attack. It makes unnecessary a change of surroundings or "a vacation in the mountains."

Although I have tried to outline a general course of intensified breathing therapy, with breathing gymnastics, it should be borne in mind that each patient must be treated individually.

Results

In the study which was the basis of this paper only patients with bronchial asthma who were not given medicinal or physical treatment either during or after intensified breathing therapy were included. Patients sent to me by other physicians with a diagnosis of "asthma bronchitis," "infantile emphysematic bronchitis," "chronic bronchitis with symptoms of dyspnea," "pseudocroup," etc., were excluded.

The patients included comprised 29 children and infants and 10 adults.

Of the children in whom the treatment was not successful, the following may be said:

Patient 7 was a psychopathic child of psychopathic parents and could not be trained therapeutically. Patient 10 had frequent quarrels with his father and always reacted with an attack; an Oedipus complex was manifest. Neither the father nor the ailing mother of patient 14 was able to carry out the general directions. The parents of patients 16, 18 and 22 could not be prevailed on to cooperate. Patient 20, a boy, was free from attacks for thirty-six months after the treatment was finished. Then an adenotomy was performed and was followed by a violent attack and three subsequent attacks.

Of the juvenile patients, 21 showed faulty posture in the form of kyphosis or scoliosis and tremor of the feet. Seven children were stout, others were thin and some were normally built. Six had eczema when they were free from asthmatic attacks. Eight were left handed. Two showed pectus carinatum.

The posture of all the children improved and the muscles hardened. Parents and teachers regularly reported an improvement in the physical capacity and a decrease in nervousness even in the children whose treatment was less successful. There was an increase in relative vital capacity, expiration time and breathing span during therapy regardless of its success, distinct changes being noticed after only three or four treatments. The results were always negative when the breathing exercises and gymnastics were not carried out consistently over a long period and when a "deneuropathization" (Rosenbaum[12]) of the patient or of his environment could not be accomplished.

Of the 10 adult asthmatic patients, only 1 became free from attacks within the time of observation. The condition of 5 improved and that of 4 was unaffected.

If the results with young patients are better than those with adults, as would appear, a number of reasons may be considered responsible. The natural delight of the young patient in sports and gymnastics makes it easier to carry out home treatment. His ambition can be stirred with less effort; his parents have a keener sense of responsibility. With the asthmatic adult there are more obstacles to overcome. First, possible emphysema or emphysematic cardiopathy make improvement much more difficult. The nervous factor in the initiation of attacks is stronger and is much more difficult to control. The self discipline necessary to overcome the natural resistance to daily exercises, cold rubs, etc., is difficult to develop in adult patients, many of whom are neurotic. For these reasons the series of treatments were much too short (six to twelve), in this study and the results were inconclusive.

The vital capacity figures for all except 2 of the juvenile asthmatic patients were considerably below those of a series of 240 healthy young people between the ages of 8 and 17. However, after one or two months of treatment the vital capacity reached or even surpassed the values for the healthy youngsters. The amount of vital capacity, however, should not be taken as a measure of the capacity of the respiratory organs, nor should it be taken as the basis for a prognosis as to the trend of the disease.

In contrast to the young patients, the adults never did achieve the vital capacity of healthy persons, though they did show an increase.

Curves derived from the figures for vital capacity and expiration time are of prognostic value. The vital capacity is measured at the beginning of each treatment and the expiration time by humming. In a successful case, a slow but constant development of the vital capacity and the expiration time is apparent. In a partially successful and in an unsuccessful case the curves are irregular. A decline in the curves between the fifth and the eighth day of treatment, accompanied by dyspnea, is typical.

Summary and Conclusions

Intensified breathing therapy consists of massage, rhythmic compressions of the thorax and breathing exercises. Intensive gymnastics are of special importance. These include sports (boxing, jujutsu, calisthenics) associated with regulated breathing. The exercises must be performed daily over a period of months or even years. Dyspnea is produced by physical strain during each treatment, but with the aid of the acquired technic of respiration it is soon "breathed away." The patient learns how to master dyspnea by concentration and regulation of respiration. Courage training, boxing, apparatus gymnastics and increased efforts during the course of treatments, increases self confidence in the asthmatic patient.

Intensified breathing therapy should be supervised by the physician and not left to the layman.

The vital capacity, expiration time and breathing span were always considerably increased during the course of treatments.

The absolute value for vital capacity cannot be taken as a criterion for a prognosis.

Prognostic conclusions can be drawn from curves derived from the vital capacity and expiration time measured during each treatment.

In the study reported, the minimum time of observation after treatment was twelve months. It was possible to keep 13 among 39 juvenile asthmatic patients free from attacks; they were under observation for three and one-half years. The disease in 10 of these 13 had lasted for more than two years before the treatment was instituted. Ten of the 29 children continued to show improvement. Six remained unaffected.

Of 10 asthmatic adults, 1 was freed of attacks, 5 improved and 4 were not affected.

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REHABILITATION OF CONVALESCENT INDUSTRIAL CASUALTIES WITH PHYSICAL MEDICINE

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After some years of effort, we now have in operation at the clinic of the Workmen's Compensation Board in Toronto a method of treating industrial casualties with physical medicine based on the following principles:

1. Therapy should not be fixed or inviolate but in a constant state of change, ready to absorb new forms or modifications of old to suit an ever new set of conditions.

2. Therapy should be aimed not only at an increased range of movement in stiff joints, abolition of pain and reeducation of muscles but also at an increase in muscle power to that needed by the workman when he renews his employment.

3. The injured workman is not a mental patient. He is keen to get back to work, and what is necessary is to build up muscle strength and limber the joints. While there are occasional cases of loss of morale or even of malingering, these are in the minority and are handled by the therapists in their stride.

4. The best form of work therapy is exercise with the tools to which the patient is accustomed. This has a threefold advantage: 1. The patient does not have to learn a new technic. 2. The proper muscle groups are exercised. 3. The patient is able himself to note his progress and to help decide on his fitness for work.

5. There should be a physical therapy and an occupational therapy department, with cooperation between the aides of the two departments.

In 1936, at the annual meeting of the Canadian Association of Occupational Therapy, I read a paper stating the need of specialized occupational therapy directed toward the physical rehabilitation of the injured workman. I pointed out the economic importance of a system of treatment directed toward shortening disability time and the advisability of a variation in apparatus, which was tending to become stereotyped. If I did not actually say it in words, I meant to imply that a modification of the concept of the role of occupational therapy was due, that complacency and satisfaction in what occupational therapy had to offer were hampering any advance in the treatment of a large and important group of cases. And, lastly, I took a definite stand on the necessity of changing the indifference of occupational therapy to physical therapy and vice versa.

I have noticed for some time that there is a tendency among physicians interested in occupational therapy to decide what is and what is not occupational therapy. Indeed, one medical visitor a few months ago, as he observed a patient shoveling gravel from one bin into another, said to me: "But that is not occupational therapy. He is not producing anything." I replied that our ideas of what occupational therapy is evidently did not coincide; but that, after all, to such an academic judgment the patient was quite indifferent; and that in my opinion he certainly was producing something. He was producing muscle so that he could go back to work, and this is the purpose of our clinic.

I believe that any task a patient is called on to perform is occupational

therapy if the movement involved is going to be of benefit. Such a task might be sweeping the floor, sewing torn sheets, changing the washer in a tap, wheeling barrow loads of coal to the stoker or any other useful task of the sort that he will have to perform when he returns to work.

Because we do not think of occupational therapy as a system limited to certain already chosen and devised crafts, we are able to fit our treatment to the individual case and are not compelled to fit the case to the apparatus or method at hand. For example, if we are treating a bricklayer with a disabled hand, we do not set him to learning some other craft but give him a thousand bricks and have him build a wall or a house or perhaps at the start just arrange them in a design on the floor. He knows how many bricks he has to handle in a day, and from the number he can handle each succeeding day in the workshop he can see how he is improving and how nearly able he is to the return to work.

We had a sign painter who was ready to work except for the fact that his grip and his shoulder muscles were not strong enough for him to raise and lower his swinging scaffold. The problem was to increase the strength of the muscles used in pulling down an overhead rope. We did not try to solve this by means of an existing craft, but took a short cut. We rigged up a compound pulley overhead and had the patient lift weighted bags of sand from the floor by pulling on the rope as he would have to do at work. When he could lift a sufficient weight he knew himself he was ready for work.

And so with other problems. Some of them are insuperable. We had a deep sea diver once. No amount of thought could work out a therapy simulating his work conditions.

Nothing I have said is meant to indicate that we do not use craft work. We have our tinsmithing shop, a large carpentry shop, a weaving room with all kinds of looms, heavy cord for knotting, sewing machines, clay modeling room, etc. There is not an electric motor in the clinic. All the power for the different crafts is hand or foot power supplied by patients needing the particular type of exercise. As soon as their diminishing disability permits, patients graduate from light to heavier exercise according to the nature of the work to which they will return. I recently discharged a patient whose employment consisted of picking up 75 pound cans of milk at the roadside. I knew, and he knows, that he was ready to return to work, because the day before in the workshop he had carried 75 pound bags of sand the way he could carry the cans. He had done this fifty times during the day, which is exactly the number of times he had to do it at work.

As the patients spend the entire day at the clinic and it is not possible or advisable for them to exercise weakened muscles throughout a whole day, we have a large number of diversional activities which provide rest by exercising other parts of the body and producing other interests.

Because in a large body of working men and women many different trades are represented, we have no difficulty in building special apparatus to be used in special cases, and this brings up another aspect of therapy on which I feel strongly: I demand that each occupational therapy aide have a good idea of the different technics and tools of the different trades. If an aide is to talk intelligently to her patient, she must speak his language, and words such as Stillson wrench, and jig must mean to her exactly what they mean to him. To carry out this idea, it is arranged that each member of the occupational therapy staff visit representative places of employment with a trained inspector of the Industrial Accident Prevention Association. She can thus see men at work in the different industries and be better

equipped to devise occupational therapy to fit both the disability and future employment. The occupational therapy aides have gone right into the killing pens of meat packing plants and into foundries, machine shops, paper box factories, tanneries and rubber plants. They know how hard the men have to work, and when, for instance, a patient says that he is a holder-up, they know he holds the dolly for the riveter, what it weighs, what muscles are affected, what joint movements are involved and what he needs in the way of physical medicine to get him back to work.

A feature of the clinic is a short staff meeting each Saturday noon. The physical therapy and the occupational therapy technicians sit with me in a circle. One of them gives a three minute talk on some anatomic region or some aspect of the work and is quizzed by the others. A physical therapy aide will ask a question aimed at stumping the occupational therapy aides, and vice versa, the idea being to have each girl thoroughly aware of the methods of treatment in the two departments and to keep the whole staff at the peak of efficiency.

This cooperation between the aides doing physical therapy and those doing occupational therapy extends throughout the clinic. One sees green uniforms in the physical therapy end and white uniforms in the workshop. The patient appreciates that he has two "nurses" looking after him and that each knows what the other is doing. I have no doubt this has much to do with the satisfactory attitude of the patients. They see friendliness about them, and they are friendly, too. Practically every one who visits the clinic —whether from Canada, from the United States or from one of the countries farther south—comments on the fact that though the patients are kept hard at work they seem happy.

This clinic is proving its economic value. It is difficult, if not impossible, to specify in dollars and cents the money saved by cutting down disability time and ameliorating disabilities, but there is strong evidence that the sum would be in hundreds of thousands. There has been an increase of 480 per cent in the attendance in the twelve years the clinic has been operating. The average time spent by patients in the clinic is twenty-one days. Occasional monthly analyses give fairly consistently the information that: 45 to 50 per cent of patients are completely cured; 25 per cent are improved to the extent that the majority go back to their own work and the remainder to lighter work; 15 to 20 per cent are slightly improved, many of them returning to light work, and 6 to 12 per cent are unimproved. In the last-named group are those who refuse treatment, others who attend for one or two treatments and then disappear and a few who are admitted pending further diagnosis.

FLUORESCENCE TEST FOR REAL AND APPARENT DEATH IN WARFARE *

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It has long been a problem in emergency medical work to determine quickly, simply and reliably whether or not a person is actually dead. This problem is most often encountered on the battlefield, especially in the sorting of many bodies which have just been subject to shell fire and bombing and in which the result may be such as to simulate death very closely. The distinction between real and apparent death has a number of significant implications for fields outside that of warfare. In the laboratory it is especially desirable at times to establish objectively the time of death in an experimental animal. In peacetime the problem has numerous variants: in determining the viability of an apparently stillborn child; in determining whether or not the use of artificial respiration, the pulmotor or other means of resuscitation should be continued or ceased, and in the case of asphyxiation, poisoning, shock, psychosis, convulsions and many other conditions which are known to induce a death-like state.

The importance of the "golden hours" in the life of a recent casualty need hardly be emphasized to those who have had to cope with any type of injury, most particularly that of extreme shock. Under the stress of fire, lack of trained personnel and other adverse conditions of actual warfare, even the surgeon may not have sufficient time to make a detailed inspection of all casualties. It is under such circumstances that an apparently dead body may easily be mistaken for an actually dead body and proper treatment delayed or wholly neglected.

The Signs of Death

Briefly, the signs of death include (1) entire cessation of the action of the heart, (2) entire cessation of the respiration, (3) changes in and about the eyes, (4) changes in the character and response of tissues and regions other than the eye, (5) changes in the body temperature, with a gradual, progressive cooling, or loss of heat, and (6) the appearance of muscular rigidity, or rigor mortis.

With the exception of rigor mortis, any or all of these signs may be seen in bodies which are not actually dead in the sense that there is no chance for life with proper treatment, and any or all may possibly be observed during the "golden hours" in the life of a casualty. Cessation both of heart action and of respiration may be attended with a death-like state which can easily be confused with actual death by an untrained worker. Entire cessation of the heart action, not for a few seconds but continuously, is usually looked on as an indication of true death. However, mere absence of the pulse at the wrist, or even in other arteries, is not sufficient, for this may be observed in a variety of conditions. Only careful auscultation and palpation of the cardiac region in a quiet room can decide the absence of heart action. It should be remembered that there is pulse wherever an artery is superficial enough to communicate its stroke to the exploring finger, as in the carotid, brachial, radial, ulnar, femoral, popliteal and anterior and posterior tibial arteries. Negative evidence from the stethescopic ex-

* From the Fluorescence Laboratories.

amination of the heart, large vessels or lungs can be considered decisive only when done some hours after the supposed death.

The act of breathing is so eminently a vital one that any long suspension of this function is fatal. Here again the stethescope proves valuable, as careful auscultation is far more likely to detect sounds caused by air, or air and fluids, traversing the tubes of the respiratory passage than any other means.

One of the manifest changes in the eye which accompanies death is an entire loss of sensibility to light. This, however, is not as reliable an indication as might be supposed, for there are other conditions in which the pupil may no longer contract or dilate according to the amount of light thrown in. In death there may also be an entire loss of sensibility to touch in the conjunctiva, but this is equally true of a period of epileptic seizure and of some cerebral injuries which may be met with in battle. In true death there is frequently seen a gray, cloudy discoloration on the outer portion of the conjunctiva, covering the sclerotic coating. This soon becomes darker and is quickly followed by a similar appearance on the inner side. Moreover, in death the cornea rapidly loses its transparency and luster; this, however, also happens in many conditions in life. In death the eye becomes recessed in its socket and the globe becomes flaccid. But loss of tonicity is also met with in certain diseases of the eye. At the same time, the eyelids lose their elasticity; neither they nor the globe will move any longer.

Gradual cooling, or loss of heat, is the most common change seen after death. In some diseases, however, certain of which have implications in military medicine, there may actually be a rise in body temperature after death. This is especially true in the case of yellow fever, a disease often met with in military operation in tropical regions. The human body requires several hours to cool, usually not less than four, and sometimes twelve or more, so that its temperature is equal to that of the surrounding atmosphere. In arctic operations this period should, of course, be less, but in the tropics, where the temperature may initially be greater than that of the body, there may even be a rise, leading perhaps to anomalous results should conclusions be based on decreases in body temperature. It is the progressive and continuous cooling, not the absolute temperature, which indicates death.

Tests for Death

Medical literature contains a plethora of information on the several minor phenomena, or tests for death, which have been observed by various workers down through the years. Few are reliable, and in inexperienced hands they may invalidate the chances for survival in apparent death.

The well known mirror test for breathing has long been known, but it is exceedingly unreliable and should never be depended on for conclusive results. Older tests may be described as follows: 1. If a scarificator and cupping glass are applied to any part, blood usually flows if life is present but fails to do so not many hours after death. 2. One early and most untrustworthy test depended on the insertion of bright, polished needles into the skin or deep tissue, conclusions being based on the extent to which they were free from rust. 3. It has been stated that hot objects and vesicants no longer produce blistering in true death. 4. The fingers and hands, especially in young persons, are translucent during life but become opaque with death. 5. A string tied tightly about the finger of the supposed corpse will, if life is not extinct, shortly cause the finger to become bluish red. 6. A temporal or radial artery was sectioned in doubtful cases so that the contents could be studied; in true death the arteries are often pale and empty of blood. 7. A

solution of ammonium hydroxide was injected subcutaneously. In the living body, or in one only just dead, a wine-colored congestion would immediately be produced, though in a body just dead a lesser degree of this effect might be observed, but in one dead for some hours, or days scarcely any change is stated to be produced.

Comparatively few tests for death have been developed during the last fifty years, and all of them are unreliable and empiric to a degree which makes their use in warfare unfeasible until they have been intensively studied.

In 1929 Fabroni,[1] using pigs and rabbits, developed a chemical test for death which depends on the restoration, after injection, of decolorized methylene blue solution by the buffering agents in living tissue. The procedure is to prepare immediately before use a saturated aqueous solution of sodium sulfate, to which is added a 2 per cent aqueous solution of methylene blue until complete decolorization has taken place. An excess of sodium sulfate must be avoided in preparation of the reagent. The resulting solution is mixed thoroughly and filtered. One cubic centimeter is quickly injected under the skin with a well dried syringe.

Fabroni found that in live rabbits and pigs the skin near the site of injection assumed an intense blue coloration which remained unaltered for several hours. In most dead animals no such blue coloration was seen, although in some a faint localized color appeared. This test has been verified on human cadavers, and it is said to be simple, rapid and reliable.

In the Lipschitz test[2] for determining the death or viability of tissues a hot saturated solution of m-dinitrobenzene in isotonic sodium chloride solution is found to be colored yellow by living tissue, but is not affected by dead tissue. Sampiro[3] developed tests for ascertaining whether death occurred suddenly or not by the epinephrine content of the adrenal glands; this however, is impractical for widespread application in human beings. Another, more technical procedure for determining the time of death is the technic of Bohne,[4] who made measurements on the freezing point of the brain.

The Uranin Test

Of all the tests for death developed during the twentieth century, use of uranin,[5] or sodium fluoresceinate, shows the greatest promise. This is not new; it dates back to 1905, to the time of Icard,[6] who injected uranin intravenously or into the deep tissue of the body. In apparent death, but not in actual death, a yellow-green color was claimed to appear in the whites of the eyes. The investigations reported here have shown that, while the Icard test is basically sound in most respects, the method and that of interpreting the results of observing the response are not reliable. The Icard test resembles another method to be found in the literature:

> A subcutaneous injection of alkaline fluorescein solution (uranin) is stated to be a most reliable method for diagnosis of death, for a still living human body acquires a yellow-green coloration within a few minutes, whereas this is not true of an actually dead body.[7]

Uranin, chemically known as the sodium or potassium salt of hydroxy-o-carboxyphenylfluorone, or fluorescein, is obtained by the condensation of resorcinol with phthalic anhydride alone or, preferably, in the presence of zinc chloride or sulfuric acid. It is converted into the sodium salt by evaporation to dryness of calculated amounts of sodium hydroxide solution and fluorescein after suitable purification, which is of course necessary when it is intended for use in the living body. Pure uranin is easily soluble in water and is harmless, having a number of other uses in the medi-

cal profession. Uranin has the remarkable feature of glowing, or fluorescing, brilliantly at great dilution. Its luminescence may be seen with the unaided eye in a dilution of 1:40 million. With filtered ultraviolet light and refinements in technic it may be detected in 1:200 million parts water, and by advanced instrumental methods even this value may be exceeded.[6]

The injection of uranin has been studied by many investigators on hundreds of human beings, and recently several methods have come to depend on the detection of this substance in tissues and organs by its bright fluorescence. For example, it has been employed to determine circulation rate by Fishback,[8] for the diagnosis of meningitis by intravenous injection and assay of its amount in the spinal fluid by Schippers and Peters,[9] and, more recently, for the diagnosis of a variety of conditions by the so-called "green-lips" test of Lange and Boyd.[10]

All of these uses are identical in principle, for they rely on the distinctive fluorescence of the lips, eyes and skin which appears after uranin is injected intravenously. In the present investigation[11] on testing for death, the fluorescence approach was employed.

Technic. — A 10 per cent uranin* solution in distilled water was prepared. This was autoclaved for fifteen minutes and a sample checked for sterility and toxicity by inoculation into a dog. In human beings, 3 to 5 cc. was injected into the arm with a 5 cc. syringe and No. 21 or 24 gage needle. In experimental animals, one-third to one-half this quantity of solution was employed.

Method of Observation. — After intravenous injection of uranin solution into the arm of a living person a portion of the dye appears within about twelve to eighteen seconds in the eye, but more manifestly in the lips and tissue of the buccal cavity. If a source of filtered short wavelength (2,537 angstrom units) ultraviolet light is directed toward the lips, in darkness, a strong, deep green fluorescence is observed, with a similar effect appearing at about the same time in the eye.

A special type of ultraviolet lamp must be used for making the observations: either the low or the high pressure mercury arc with a quartz envelope and a filter with suitable transmission in the shorter wavelength regions will prove satisfactory. In the present studies a model 421A Mineralight,** outfitted with a Corning glass filter No. 986, 2 mm. thick,*** was employed. It appears that the quality of light generated by such a radiation source is able to penetrate the surface of the tissue more effectively. This is not particularly true of the long wavelength type lamp, for several light sources have been tested and unsatisfactory results were always obtained if the wavelength was not properly chosen.

Injections of uranin and inspection of the lips and eyes with the ultraviolet lamp have shown that in a dead human being, dog, cat or rabbit, green fluorescence is not observed. For example, large amounts of the dyestuff, up to five times the quantity usually used for the test, were injected into the deep tissue of the neck of cats and dogs electrocuted or asphyxiated with carbon monoxide. Animals which had been dead for a half an hour did not respond, nor did those which had been dead for longer periods. Like results were obtained on human cadavers.

These results parallel the original observations of Icard. They show that the response depends to a certain extent on a minimal circulation in the blood vessels and in the capillary beds, as is evident in a green fluores-

* I used Calcocid Uranin B-4315 made by the Calco Chemical Company of Boundbrook, N. J.
** The Mineralight ultraviolet lamp is manufactured by Ultra-Violet Products, Inc., of Los Angeles 27, California.
*** Corning glass filters are made by the Corning Glass Works, Corning, N. Y.

cent skin response about the site of injection. At present, however, it is my recommendation that additional work be performed before the test is actually employed, for it is not thoroughly known what factors, if any, may invalidate the response. However, with the use of filtered ultraviolet light the uranin test for death is rendered fully a thousand times more delicate than the 1905 procedure, in which color alone was the criterion.

Projected Approaches in Death Testing

The known methods for distinguishing real and apparent death are all more or less empiric. This is unavoidable because of the nature of the death process. The death of a biologic system as complex as the human body is not an instantaneous transition but is one of progression in which certain organs and tissues are involved by degrees. This fact renders any approach to a precise, thorough and perfectly reliable death test exceedingly difficult for the investigator.

In my laboratory two objective approaches have been under consideration: (1) chemical, depending on certain of the changes in chemical composition of tissues which invariably attend death, and (2) physical, depending on certain changes in the physical characteristics of the tissues in death. Physical changes in dead tissues are of course the direct outgrowth of chemical changes, so the two are very closely related.

Of the chemical approaches, exclusive of the uranin test, the best appears to lie in the detection of changes in the *p*H, or buffering salt content, of tissues. For example, living muscles at rest have a double, or what is termed an amphoteric, nature in regard to their acidity-alkalinity balance; that is, they affect chemical indicators, such as litmus, usually as an alkaline medium or, under some circumstances, as an acid medium. In death this delicate balance is disrupted, a fact which is the underlying principle of the Fabroni test, in which the color of methylene blue dye is restored because of the action of tissue substances on the sodium sulfate which has been added to decolorize it.

As instrumental methods are by far the more sensitive for detecting and accurately measuring changes of this kind, it is reasonable that a small device consisting of two metal, needle-like electrodes, connected to a sensitive galvanometer, can be developed. The electrodes would be inserted into the tissue, and near them an injection of a very weak electrolyte made. An initial current would be set up between the electrodes, just as in the wet cell battery; shortly afterward the buffering agents in living tissue would act against the electrolyte and so render their presence manifest by fluctuations in potential on the galvanometer scale.

Several physical approaches can be employed, the best of which on the basis of present knowledge depends on the measurement of the relative transmission of light through tissue. A bright light placed behind the hand of a living person in a dark room will show the hand as pink-red and almost transparent during life, and in death this phenomenon is not observed. Hence, it can be expected that with a light source of constant intensity and a small-spot photoelectric photometer a quick and accurate determination can be made on some section of tissue, such as the palm of the hand, the web of skin between the thumb and first finger or the rather uniform thickness of tissue of the cheek. Recently Jablons[12] described such an apparatus for measurements of the circulation rate. The Jablons' device depends on the principle that:

Light transmitted through various translucent tissues of the body, such as the ear, finger or toe tips, or flexible skin anywhere on the body (such as that over the calves of the legs, the arm pit or the skin web between the thumb and index finger), can be detected by means of a sensitive photoelectric cell.

Interference with the transmission of light by a nontoxic dye, injected so as to act as a temporary curtain to impede the transmission of light, can be observed by the deflection of the indicator of a sensitive galvanometer connected with a photocell. The time elapsing between the injection of the dye into a vein of the arm or leg and its arrival at the point where light and photocell have been placed can be determined by a stopwatch or recorded on a strip of moving paper in a more elaborately designed device. Thus, the idea of a "photoelectric death detector" holds much promise in any consideration of methods for the distinction between true and apparent death.

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THE ARMY REHABILITATION PROGRAM FOR THE BLIND AND THE DEAFENED *

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The rehabilitation of seriously handicapped military personnel becomes increasingly important as more and more of our troops engage in combat. Among the most formidable disabling conditions encountered in soldiers are blindness, deafness, amputations of the extremities, paralysis following nerve injuries, and facial disfigurement. In this paper I shall discuss only the Army program for rehabilitating personnel with loss of sight and impairment of hearing.

In Surgeon General's Office Circular Letter No. 162, issued last September, it was pointed out that the particular emotional problems of the newly blinded and deafened and their need for assistance in learning how to live without sight or hearing create a need for specialized rehabilitation.[1] A discussion of these disabilities will illustrate the Army's basic philosophy of management of handicapped military personnel.

Misinformation about blindness and deafness as a military problem is being circulated at this time. There have been rumors to the effect that many thousands of cases of deafness among servicemen may be anticipated as a result of this war, that every combat aviator may expect to suffer serious impairment of hearing, that there are thousands of war blinded and that a gigantic breeding program for dogs to guide blinded soldiers will be necessary to meet the demand. Fortunately, all of these rumors are untrue.

Let us review some facts and attempt to determine the extent of the problem of blindness in soldiers.

As a result of World War I,[2] France in 1922 had 2,200 blinded pensioners; Great Britain had slightly under 3,000. The United States Veterans' Administration figures show about 300 pensioners with service connected visual loss. The American war blinded were cared for in General Hospital No. 7. Here, in a converted private estate on the outskirts of Baltimore, rehabilitation of the blind was started by teachers of braille and an experienced leader in recreation and handicraft. Of a total of 117 cases of blindness treated, 65 soldiers were totally blind and 52 had varying degrees of visual loss. High explosive shells, shrapnel and hand grenades caused 67 of these 117 cases of disability, and machine gun and rifle bullets caused 12.[3]

So far in the present world war the renowned St. Dunstan's agency for the care of the blind in Great Britain has known of 288 British servicemen and civilian casualties.

The United States Veterans' Administration reported, as of January, 1944, 99 veterans with varying degrees of blindness. Of the 86 discharged with blindness from the Army, 17 were totally blind.[4] As of the first of March, 73 cases of blindness were registered with the Office of the Surgeon General. There were, in addition, 2 blinded prisoners of war under treatment. Blindness is said to exist, by Army definition, when the best corrected vision is 20/200 in the better eye.

Of 42 patients admitted to one of the hospitals designated to care for

* Reprinted, J. A. M. A. **125**:321 (June 3) 1944.

the blind in this war, the reports show 17 cases of blindness due to wounds incurred in action, 18 cases due to injuries accidentally incurred and 7 cases due to disease. Six of the 17 battle casualties were caused by land mines or booby traps and 7 by shrapnel. Land mines caused 6 of the 18 accidental injuries, and dynamite blasts caused 5.[5] Sir Ian Frazer has been quoted[2] as saying that in World War I, two-thirds of the cases of blindness were due to wounds caused by high explosive shells from which fragments of metal penetrated the eyes. In the present war he is reported to have found more blinded by concussion followed by hemorrhage. A detailed analysis of the American blinded has not yet been made.

Two hospitals, Dibble General Hospital, Menlo Park, Calif., and Valley Forge General Hospital, Phoenixville, Pa., have been especially equipped and staffed as ophthalmic centers. Here programs of social rehabilitation are initiated and carried out simultaneously with medical or surgical treatment that may be required. To insure that blinded soldiers shall have the benefit of the most expert care at all times, the War Department requires that each such casualty occurring in the United States or returned from overseas shall be reported to the Surgeon General, in whose office the case is then followed until medical and surgical treatment and social rehabilitation are completed and the patient is transferred to the Veterans' Administration for vocational training.

It is important to have specially trained personnel contact the blinded soldier early in order to encourage the patient and keep him looking hopefully forward to the prospect of a full and useful life. A consultant, who has been blinded in this war and is well adjusted to his own handicap, is dispatched to the first hospital of residence of a newly blinded casualty in order to provide psychologic and emotional support. The blind consultant also arranges a temporary training program to bridge the period of time until the newly blinded soldier may be safely sent to one of the two special hospitals.

At the hospital designated for the care of the blind, the soldier is taught how to dress and shave, and how to feed and care for himself. He is taught to use a typewriter, as this must now be a means of communication with his friends. He is taught how to write and how to tell the time of day with a braille watch. The Talking Book opens to him the world of literature, even before he learns to read braille. Radios, which are made available, offer much enjoyment. He is taught the braille method of reading and writing, and those who enjoy reading are encouraged to extend their study of braille. There teachers whose eyes have not been injured insure neatness of dress and good posture. Occupational therapists teach them to use their hands, to develop new perceptual skills and manual dexterity, and thus assist in restoring confidence through useful work. When the patient has learned to get about readily, he is encouraged to enlarge his social contacts, visit the city, go to concerts and get about in the world among his friends. The Red Cross makes an important contribution also in developing the family's understanding of the problems of the blind. The family is advised concerning how it may assist the patient and encourage him to develop self reliance.

The President's "Committee on Rehabilitative Measures to be carried on by the War and Navy Department with respect to blinded service men" recently extended the responsibility of the Army beyond the customary period required for adequate medical and surgical treatment. Under this plan a center will be established adjacent to one of the special Army hospitals for the blind. Here blinded service personnel of the Army, Navy

and Marine Corps will be given further training in social adjustment for an average period of from four to six months. During this time, aptitudes and interests will be explored and tested in prevocational training.

The Veterans' Administration is charged by law with the vocational training of incapacitated discharged soldiers. To enable the blind promptly to become self suppotring, the Veterans' Administration will complete arrangements for such vocational training prior to their discharge from the service.

There is much interest in the matter of guide dogs, the public generally having the idea that every blinded person should have one. Experience shows, however, that only about 10 per cent of the blind can use dogs advantageously. Many blinded soldiers will develop the ability to get about with the minimum of assistance. With a skilfully used cane they are inconspicuous and unencumbered. Some individuals do not like dogs; others are temperamentally unfitted for canine companionship. It is important to have determined the type of work to be done and whether a guide dog will be practical and compatible with the future choice of a job. Even when the use of a dog is contemplated, it is better for the blinded individual first to develop his complementary senses to the fullest extent. The Veterans' Administration and the Medical Department of the Army concur in the belief that a veteran should secure a guide dog only when it is shown that the dog is the best solution to the veteran's problem. Private guide dog agencies have agreed to provide dogs to blinded soldiers either gratis or at nominal cost. It appears that the facilities of these agencies will be adequate to meet all anticipated needs and that governmental aid in supplying dogs will not be required.

The Hard of Hearing

The problems involved in rehabilitating the hard of hearing do not differ greatly from those outlined for the care of the blind. The immediate objective, however, is different, for many of the hard of hearing patients, after adequate medical treatment, can be trained in speech and lip reading, fitted, in most cases, with a hearing aid, and then returned to limited duty in the military service.

In the first world war, 1 man in 5,000 was discharged for defective hearing.[6] The Veterans' Administration on Oct. 28, 1943 had on the compensation or pension rolls 416 veterans of World War I who were totally deaf, and 12,497 who were partially deaf. Meningitis was the cause of 25 per cent of the hardness of hearing.[7]

The Statistical Division of the Surgeon General's Office estimated on Dec. 30, 1943 that the average annual admission rate to Army hospitals for deafness and defective hearing was approximately 1 in 1,000 per annum. This estimate was extended on Feb. 12, 1944 to predict a discharge rate for men with defective hearing of about 34 per hundred thousand annually (as compared with 20 per hundred thousand annually in World War I). On Jan. 1, 1944, 313 patients with defective hearing had been admitted to the three hospitals which have rehabilitation services for the deaf.

In a study of 102 cases of deafness[8] 54 were of perceptive deafness, 34 had mixed perceptive and conductive deafness, 4 had conductive deafness, 6 had otosclerosis and 4 were deaf because of other disorders.

In another series of 153 cases[9] defective hearing had existed prior to induction in 48 cases and was considered progressive and not aggravated by service, 21 cases of partial deafness resulted from the blast of high explosives during enemy action, 10 cases of partial deafness were due to heavy firing not acquired during combat and in 17 cases impairment of hearing

existed prior to induction and was considered to have been aggravated by service.

While the rate of incidence of deafness seems increased, not as many cases have developed as might have been expected from the increased hazards in this war due to blast and noise. Persons with impaired hearing have not been received for rehabilitation from the Army Air Forces in greater proportion than from other branches of the service to date.

Three hospitals have been designated for special care of the deaf. These are the Deshon General Hospital, Butler, Pa., the Borden General Hospital, Chickasha, Okla., and the Hoff General Hospital, Santa Barbara, Calif.

In Circular No. 81, issued Feb. 23, 1944, the War Department directed that "every case in which the impairment of hearing shows a true loss in the better ear of 30 decibels of hearing within the conversational range (256-2,048 decibles), or a loss of 3/15 or below to whispered voice, when an audiometer is not available, in a case of stationary or progressive deafness free from acute inflammatory aural disease, will be transferred to a hospital designated for the rehabilitation of the deaf at the earliest practicable date.

"Hearing aids are furnished to personnel in active military service who are suffering from hearing defects that preclude the performance of military duty, regardless of line of duty status, when examination shows that such aids will materially improve the hearing of the individual concerned." [10]

The three hospital centers for the deaf previously mentioned are the only ones authorized to fit hearing aids. In each case the particular make or model of hearing aid is selected only after careful objective and subjective tests made by the Army's own acoustic experts. Individual ear molds are supplied in each case.

The rehabilitation service to the deafened provides training in residual hearing and lip reading. Experienced teachers give daily lessons to those who require such training. Group practice and movie film instruction have been found to shorten the learning time for lip reading. Most patients become able to read lips in from six to eight weeks. Speech teachers are also on duty in the three special hospitals to prevent deterioration in speech.

It is pointed out again that after periods of rehabilitation many of these men can be returned to military duty in specialized assignments. Those servicemen who are unfit for further military duty will be enabled to secure vocational training more easily and ultimately to obtain satisfactory positions in civil life. In partial summary it may be said that:

1. The number of cases of blindness in our Army in this war is still small, 73 having been recorded by March 1, 1944.

2. Two specially staffed and equipped ophthalmic hospitals receive all newly blinded casualties. A reporting system insures that all cases are found and transferred to these special hospitals for necessary medical and surgical care and initiation of social rehabilitation.

3. The Army is setting up a facility for the social rehabilitation of the blind, following necessary hospitalization, not only for its own, but also for the blind of the Navy and the Marine Corps. The program will provide for social adjustment, teaching of braille and prevocational training.

4. Deafness in World War II is increased over that in World War I on the basis of figures now available.

5. The Army rehabilitation program for the deaf includes (*a*) treatment of all deafened in three special hospital centers, (*b*) supplying properly fitted hearing aids to all who will benefit by their use and (*c*) offering instruction in residual hearing, lip reading and proper speech control.

(*Continued on page 506*)

TRENCH FOOT *

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Baron Larrey[1] described the ravages of cold during Napoleon's ill-fated attack on Moscow and was the first to recognize the condition now known as "trench foot." He showed that the extreme cold was not responsible but that it was lesser degrees of cold associated with dampness; nevertheless, the armies engaged in 1914 were not prepared for the great number of cases which the special conditions of static trench warfare produced. Since then, however, many articles and much experimental work have added to our knowledge of the pathology of trench foot.

Lake[2] found that explanted heart tissue growing vigorously in vitro could be stored at 0 C. sometimes for weeks in complete inactivity but would resume growth and pulsation when the temperature was again raised. When the vitality of these reactivated, cold-stored explants was tested, in no way could they be distinguished from other tissues in which life had been maintained at normal temperature. Lewis[3] and Lake[2] found that when tissue cultures were exposed to temperatures of about —5 to —7 C. permanent death occurred promptly. This temperature range included the point of solidification of the cellular protoplasm. Observation of the intracellular structure after such exposure showed that the protoplasmic framework was disrupted. Lake showed that the survival rate of tissue exposed to temperatures between 25 and 10 C. was shorter than in tissue exposed to temperatures of 0 to 10 C. Smith, Ritchie, and Dawson[4] experimentally produced a condition closely resembling "trench foot" by exposing rabbits to wet cold under varying conditions. It was found that division of the somatic or the perivascular sympathetic nerve supply failed to prevent the effects of the exposure; indeed, in the latter the manifestations of pathology were more severe than in the controls. In the vascular experiments, it was obvious that any means of restricting the blood supply during the thaw period was of value. Local vasoconstrictors were used and it was shown that gangrene of the skin of the exposed foot was consistently prevented by tying the main artery of the limb. In human experiments the effect of exposure of small areas of skin was often abolished by using local vasoconstrictors (adrenalin), while in the control areas the skin sloughed and left permanent scarring. It was also observed that multiple incisions of punctures which allowed the exudate to escape would prevent gangerne. Lewis showed that cooling the body as a whole results in peripheral vasoconstriction, which in turn encourages cooling of the extremities. It appears, therefore, that the following are factors in the damage caused by cooling.

1. The critical temperature for cooling tissues appears to be in the region of —5 to —7 C. Tissues cooled below this temperature are killed by disruption of their intracellular protoplasmic structure.

2. Down to the critical temperature cold has no detrimental effect on the individual cells of any tissue.

* Reprinted with permission, Bull. U. S. Army Med. Dept. **77**:91 (June) 1944.

3. Exposure of parts of the intact animal to cold above the critical temperature results in retention in the tissues of metabolites which, during the period of thaw, cause a violent vascular reaction leading to transudation of fluid from the vessels. The transudation may be sufficient in amount to be important in causing gangrene.

"Frostbite" is a term that should be reserved for the condition in which tissues have been cooled below the critical temperature. "Trench foot" is a term which should be reserved for feet which show evidence of damage due to cooling above the critical temperature.

Clinical Picture

The victim does not always recognize the onset of trench foot, for, although the initial exposure may produce uncomfortable sensations of coldness on the surface, as the deeper tissues are chilled local anesthesia develops and the parts become relatively insensitive. In this numb state small traumata which may have serious consequences later will pass unnoticed. With a rise in temperature the first sign of trouble is revealed by swelling with a dusky pallor followed later by an intense flush. This is the stage of maximum pain. If of slight severity the swelling lasts several days and then begins to subside with concurrent change of the color to normal. The surface layers of the epithelium may desquamate and paresthesiae may remain for a long time. In many instances the skin subsequently becomes thin and cold and shows a delayed return of normal color after pressure. There may be some apparent shrinkage of the subcutaneous tissue.

In severe cases the swelling and the discoloration are more marked, blisters form, portions of skin became gangrenous and the vasodilatation and transudation are so marked that the area of red, hot, tender, edematous skin may extend well up the legs. In very severe cases the picture is exactly that of dry gangrene of the distal portions of the extremity and this gangrene may be clinically indistinguishable from that of true frostbite. When the stage of vasodilatation and transudation have passed, it is usually surprising how little tissue has actually become gangrenous. The rate of recovery seems to be inversely proportional to the severity of the disease but this is not an absolute relation.

Analysis of Cases

Among 144 cases of trench foot in this hospital, 9.7 per cent had a family history of diabetes, 33.3 per cent a family history of hypertension, 27.6 per cent a past history of symptoms from exposure of the feet, and 86.2 per cent a history of smoking. Among 877 other patients in this hospital for other conditions, none of whom had symptoms from exposure of the feet, 13.3 per cent had a family history of diabetes; 32.8 per cent a family history of hypertension; 26 per cent a past history of exposure; and 87.6 per cent a past history of smoking.

This is presumptive evidence that a past history of symptoms from exposure, a family history of diabetes and hypertension, and a past history of smoking are not important predisposing factors.

TABLE 1.

	Total	Mild	Mod.	Severe	Avg. Exp.	Avg. Age
Past history of exposure	52	34	12	6	9.6 days	22.7
No past history of exposure	41	14	16	11	8.0 days	22.6

A group of patients with a past history of symptoms from exposure was compared with a consecutive series of patients without such history (table

1.) It seems that the past history of symptoms from exposure did not influence the amount of exposure necessary to produce trench foot, the severity of the damage, nor the age at which the condition developed.

Treatment

A series of 88 consecutive cases was divided into three treatment groups. The first group was given a regular hospital diet, absolute rest in bed, and as much codeine as required to keep them fairly comfortable. The second group was in addition given Buerger's exercises four times daily under the supervision of a trained ward man. The third group was given no exercise but was given 50 mg. of thiamin chloride hypodermically twice daily. The variations in severity were about the same in the three groups. No cases of gangrene were included. These patients were under observation for an average of fourteen days. We were unable to demonstrate or detect any significant difference in the comfort, amount of sedation required, or the rate of recovery in the three groups.

Several writers[5-6-7] have suggested that block of the sympathetic ganglia with novocain might be helpful in this condition. Unilateral novocain block of the lumbar sympathetic ganglia was done in 20 cases. Four of these cases were characterized on the fourth day of illness by massive bilateral edema of the feet and ankles and markedly increased temperature of the skin of the feet, but without evidence of gangrene. Normal arterial pulsations were easily palpable in all. In each case satisfactory block was obtained as judged by prompt flushing of the skin of the whole leg and corresponding increase in the skin temperature as compared to the uninjected leg. In no case was pain a prominent part of the picture nor was it apparently influenced by the block. There was no decrease in tenderness. The swelling gradually subsided in several days but in each case the rate of improvement was the same as in the untreated extremity.

Ten milder cases with marked pain and tenderness equally distributed in both feet, normal palpable arterial pulsations, and no gross edema were blocked unilaterally in a similar manner. Seven of these cases had a temporary diminution in pain and tenderness but at the end of six hours there was no evidence of any difference between the two feet, nor was the course of the disease in the treated foot different from that of the untreated one during the next two weeks.

The third group unilaterally blocked comprised six cases of bilateral, cool, painful feet in the late stage of the disease, all with absent or barely palpable dorsalis pedis and posterior tibial pulsations. The immediate effect of block in these cases was typically vasodilatory with marked relief of pain which persisted even after the vasodilatation had subsided. In two cases a second block was done eighteen hours later on the same side and further relief obtained. That the rate of improvement in these cases was accelerated in the treated foot was evidenced by complete freedom from symptoms and the ability to bear weight on the treated foot about one week before similar function could be carried out by the untreated foot.

In the folklore of the Esquimaux, vague ideas have been expressed about the application of cold to tissues damaged by cooling. Recently the experimental work of Brooks and Duncan[8] and the extensive clinical trial of Webster, et al.[9] focused attention on the use of dry cold in immersion foot and allied conditions.

In four of our cases with bilateral gangrene, dry cold was applied to one foot by means of ice bags changed at very frequent intervals, while the other foot was left exposed to the temperature of the ward. The patients

were given a regular hospital diet and sedation as needed to keep them moderately comfortable.

CASE 1. — A private, aged 20, admitted 8 January 1944. Family history was good except for moderate hypertension in his mother; past history, excellent; smoked twenty cigarettes a day for thirteen years. Feet wet and exceptionally cold 28 December to 7 January 1944, in freezing weather. On 31 December 1943 removed shoes because of numbness and pain in both feet, at which time all toes were almost black and most of the foot dead white. Marched for seven hours en route to rest area just prior to hospitalization. Examination showed swelling of both feet with exquisite tenderness and a line of demarcation on the right foot about midway on the longitudinal arch; below this line the skin is black, insensitive, and cold; above the line are intense redness, brawny induration, tenderness, and markedly increased heat of the skin. This reaction extends over all the lower one-third of the leg. On the left the line of demarcation runs from the base of the 2nd toe about the base of the first toe. Distal to this line is the same black, insensitive, cold skin, proximal to it the same marked inflammatory reaction which extends to about the level of the maleoli. Moderate inguinal adenitis.

Treatment. — The right foot was bathed in alcohol, wrapped in a thin sterile towel, surrounded by five carefully dried ice bags which in turn were surrounded by a large bath towel, and the whole enclosed with oiled silk. Ice bags were changed about every hour and one-half.

Course. — Completely afebrile. Throughout the first eight days the patient had moderately severe, aching pain in the left foot, none in the right. By the end of the second day the line of demarcation on the left foot had become firmly established; shrinkage of the toes distal to the line then became progressively more marked. The swelling in the two feet subsided about the same time and was all cleared in fourteen days. The line of demarcation remained indefinite on the right, could be noted to recede distally for about eight days, when it became fixed just at the base of the skin of the toes. Gradual separation at both lines of demarcation set in at about the tenth day, revealing healthy granulation tissue just under the deepest layers of the skin. Throughout the period it was impossible to cool the foot by this method so that the skin felt very cold to the examiner's hand, although it was maintained at a temperature a number of degrees below that of the left foot.

CASE 2. — A private, aged 19, was admitted on 8 January 1944. Family history good. Past history excellent. Feet wet and exceptionally cold 28 December 1943 to 6 January 1944 in freezing weather. Did not remove shoes in this period. On 4 January 1944 noted numbness and pain in both feet. Very little walking at end of period of exposure. Examination showed both feet swollen. Line of demarcation on both feet at about level of transverse arch; below this line the skin was black, insensitive, and cold, and above the line intensely red, brawny, tender, and hot. Pulsation in dorsalis pedis bilaterally good. Marked tenderness and pain in both feet. All toes apparently gangrenous. Both feet bathed in alcohol, the right wrapped in a thin sterile towel surrounded by five ice bags which were changed every hour. Pain in left foot so intense patient required morphine every four hours and still was very uncomfortable. Swelling in the left foot increased for the next five days; at end of two days line of demarcation on the left had become very clear-cut just distal to base of all toes with some increasing loss of substance distal to the line. On the right, line of demarcation remained indefinite for eight days, gradually receding distally for nine days as swelling in right foot decreased. Ice discontinued at end of nine days because of cessation of all inflammatory reaction. At no time was it possible by this method to get right foot so cold that it felt very cool to the examiner, although its temperature was maintained a number of degrees below that of the untreated foot.

CASE 3. — A private, aged 29, was admitted on 8 January 1944. Family history good. Past history excellent. Feet wet and exceptionally cold 25 December 1943 to 5 January 1944 in freezing weather. Very little walking at end of period of exposure. Onset of numbness and moderate pain 3 January 1944, but shoes not removed at that time. Examination showed swelling of both feet, extending to knee on left, to lower one-third of calf on right. On left foot, line of demarcation about bisects the longitudinal arch; below line the skin is black, insensitive, and cold; just proximal to line is a very large bleb containing clear fluid, another such bleb on heel; the rest of skin of foot and lower leg is intensely red, brawny, hot, and tender. On the right the line of demarcation is about at level of transverse arch; several clear blebs proximal to this line where the skin is red, hot, tender, brawny, distal to line the skin of 1st, 2d, 3d and distal phalanx of the 4th toes is black, insensitive, cold. Both feet bathed in alcohol, the left foot wrapped in thin sterile towel surrounded by five ice bags,

changed every forty-five to sixty minutes because of rapid melting of ice. At that is was impossible to keep left foot cold enough for the skin to feel cool to examining finger, although its temperature was kept many degrees below that of the untreated foot. Swelling in left foot increased slightly for four days, then gradually subsided. Swelling in right foot increased for six days, then decreased. There was more pain in right foot than the left. On the right, line of demarcation had become stationary distal to original location at end of fourth day; on the left, line remained indefinite for sixteen days, then became definite just distal to transverse arch. Because of degree of involvement patient was on sulfathiazole. On 23 January temperature rose to 102 F. Temperature became normal soon after drug was discontinued.

Case 4. — A private, aged 21, was admitted on 8 January 1944. Family history good. Past history excellent. Feet wet and exceptionally cold 1 January to 4 January 1944 in freezing weather. Onset 2 January of numbness and pain; shoes not removed at the time. Very little walking at end of period of exposure. Examination showed both feet swollen. On the right, a line of demarcation at base of the 1st toe extending around base of terminal phalanx of 2nd toe. Distal to this line, skin is black, insensitive, cold; proximal to line, swelling, redness, tenderness, increased local heat, and induration of the skin with three clear bullae. On the left is line of demarcation at level of transverse arch; distal to line the skin is black, insensitive, cold; proximal to line, the skin is red, hot, tender, with five large clear bullae. Swelling on right extends to level of maleoli. Both feet were bathed in alcohol; the left then wrapped in thin sterile towel surrounded by five ice bags which were changed every two hours; impossible to keep treated foot so cold that the skin ever felt really cool to examining hand, although it was kept many degrees cooler than the untreated foot. Swelling on left foot remained stationary for four days, then gradually receded. Line of demarcation on left remained indefinite, gradually receding for ten days, then became stabilized at base of terminal phalanx of 1st and 2nd toes. On the right, line of demarcation remained stabilized from time of admission; within two days there was beginning shrinkage of tissue distal to the line. Swelling in right foot continued to increase for three days, then gradually subsided. Throughout there was slightly more pain in the untreated foot. Ice was withdrawn 22 January because of absence of inflammatory reaction.

We applied this form of dry-cold to one side in four milder cases with bilateral swelling but without gangrene, to the involved foot in two cases with unilateral gangrene of all toes and to both feet in one case with presumptive gangrene of all toes of both feet.

These cases are insufficient as a basis for sweeping conclusions because (1) the number is too small, (2) in the gangrenous cases there was a difference in the extent of the process in the two feet and we treated the worst foot, and (3) they arrived at this hospital from one to five days after the end of their period of exposure. It was obvious, however, that the cooling had a marked analgesic effect and it did no appreciable harm, even in badly damaged feet. In our cases this method of cooling was very inefficient.

Fitness for Duty

While most authors dwell on the chronicity of this condition and speak of prolonged sensitivity to cold, we found only one reference to the disposition of such cases from a military standpoint. Ungley[10] described a follow-up on 18 of 80 cases which revealed that 2 had been invalided, 7 were doing full duty, and 9 were doing limited duty.

We had 38 patients whose symptoms were very mild but whose history revealed that their symptoms had recurred so promptly and so often when their feet became even mildly cold that they were unable to do combat duty. In a very large number of our cases, the response of the skin to slight changes in the temperature was striking. When the feet were first removed from under the covers, the skin was of about the same temperature as that of the lower leg; but when the feet had been exposed to the cool air of the ward for five minutes, the skin of the feet was much colder than the skin of the leg.

Davis et al.,[11] using thermocouples and cold chambers, demonstrated the striking difference between the rate of cooling of the skin of a hand previously damaged by cold and that of a normal hand. However, our study suggests that past history of symptoms from exposure is not an important predisposing factor in the production of trench foot. About 60 per cent of our cases were so mild that they were ambulatory on the fourth day of hospitalization.

An effort has been made to evaluate these patients from the standpoint of fitness for full duty. Eighty mild cases were subjected to five-mile hikes daily, conducted by an officer patient convalescing from this condition; cold pressor tests were applied in the usual manner and by submerging one foot in the ice bath and recording of the pulse and blood pressure variations and the time of appearance of pain. Those patients who had no subjective or objective changes from at least three hikes and no abnormal response to the cold pressor test were returned to full duty. In this manner 62 patients were returned to full duty after an average hospitalization of twenty-one days. It has not been possible to check up on all these patients; however, two of them have been readmitted here.

An officer with three years' service was admitted on 12 December 1943. His feet had been wet and cold for ten days in nonfreezing weather. He had moderate swelling of both feet with numbness, itching, and burning on exercise and when feet were warm. Because of the tactical situation, he was unable to report for hospitalization for one week. During this week the swelling slowly subsided while the itching, burning, and pain increased. He had no previous history of symptoms from exposure. Examination at time of admission here showed no swelling or discoloration of the feet. The feet were cool and dry with moderate tenderness pressure over the balls of both feet. The tenderness disappeared within four days on simple rest. He conducted six of the five-mile hikes without objective or subjective changes. Cold pressor test was normal. He was returned to full duty on 29 December 1943 and was readmitted to this hospital on 8 January 1944. He had stayed in the replacement center five days then rejoined his organization; on the following day he marched about eight miles and moved into a defensive hill position. His feet became wet and cold and he promptly developed deep-seated, aching pain. Through that night the tactical situation permitted some sleeping in the foxholes, but the pain in both feet prevented this. On the following morning he was sent back for hospitalization by his battalion surgeon. At the time of admission here there was no objective evidence of disease and the pain had subsided.

A sergeant with nearly three years' service was admitted on 5 December 1943. His feet were wet and cold for seven days in nonfreezing weather. There developed mild swelling, burning, and aching of both feet. The swelling lasted two days. On admission here there was no swelling, both feet were cool and slightly tender. In eight days of simple rest all symptoms subsided. He went on three of the hikes without objective or subjective changes in the feet. Cold pressor test was normal. He was returned to full duty on 16 December 1943, but was readmitted on 4 January 1944. After ten days at the personnel center he had rejoined his organization. Five days later he went on a five-mile forced march during which his feet were wet and cold. His feet became slightly swollen, painful, and tender so that he was unable to walk. On admission there were mild tenderness and mild pain, but no swelling. All symptoms cleared within forty-eight hours on simple rest. He was then reclassified to limited duty.

Discussion

Although it seems to be clearly recognized in the literature (The Bulletin has stressed the importance of slow thawing and the application of actual cooling during the period of thawing), only 34 of our patients gave a history of any specific effort being made at previous medical installations to bring this about. This omission of early treatment is extremely important, for after several days have elapsed the golden opportunity has been lost, and there is little reason to think that any therapy later will be particularly helpful. This condition should be considered as a medical emer-

(*Continued on page 506*)

NOTICE TO CONGRESS MEMBERS

Notice is hereby given to each voting member of the Congress that the following resolution as to amendment has been adopted by the Board of Governors and will be presented for your consideration at the forthcoming meeting of the Congress in September:

PROPOSED RESOLUTION TO BE ADOPTED

Be it resolved that the Board of Governors of the American Congress of Physical Therapy deems it advisable that the paragraphs numbered 1, 2, and 3 of the Articles or Certificate of Incorporation of the American Congress of Physical Therapy, issued by the Secretary of State, State of Illinois, March 31, 1930, be amended to read as follows:

"1. The name of such corporation is American Congress of Physical Medicine.

"2. The object for which it is formed is to promote the study and scientific development of physical medicine; to sponsor and finance scientific research on physical medicine and allied subjects; to disseminate information and stimulate interest in physical medicine; to acquire, own and publish a publication or publications in connection with and in furtherance of the subjects herein stated; to promote, establish and conduct a school or schools for instruction in physical medicine; to accept and receive bequests, endowments and gifts for the promotion of the objects herein stated.

"3. The management of the aforesaid American Congress of Physical Medicine shall be vested in a board of ten (10) Governors."

The Board of Governors accordingly directs that there be submitted to the voting members of the Congress of Physical Therapy at the annual meeting to be held in Cleveland, Ohio, September 6, 1944, the proposition as to whether or not the proposed amendments above recited shall be adopted.

Board of Governors of the American Congress of Physical Therapy,

By Richard Kovács, Secretary.

ARCHIVES of PHYSICAL THERAPY
OFFICIAL PUBLICATION AMERICAN CONGRESS OF PHYSICAL THERAPY

.·. EDITORIALS .·.

SOME OF THE CONTRIBUTIONS OF ALBERT EIDINOW

Dr. Albert Eidinow, one of the pioneers in the investigation of light therapy and one who has done much to establish good technic in the use of various types of light therapy, has died. Those interested in physical medicine will miss Dr. Eidinow's splendid work and many contributions. While working in the St. John Clinic and the Institute of Physical Medicine in London, he was in charge of the department of light therapy. There he designed the daylight lamp. This daylight lamp consisted of a long quartz tube which would emit weak ultraviolet rays and a number of incandescent lamps which produced portions of the infra-red spectrum; the latter were hung on each end of this ultraviolet generator. Thus this lamp produced spectral characteristics similar to that of natural sunlight. He found that flowers and dyes appeared to be the same tint under this as in daylight. The lamp was used in picture galleries, in millinery shops and the like. He found that an hour's exposure of the nude body to this lamp produced the same results as similar exposure to the midday sun. The lamp was found useful in the treatment of psoriasis and in certain cases of lupus in which the local lesions were treated by intense radiation of the Kromayer ultraviolet lamp.

Dr. Eidinow also invented a small ultraviolet lamp which could be introduced into the mouth. This was used for the purpose of treating certain infections of the mouth and throat.

Dr. Eidinow recognized use of the incandescent lamp focused by concave metal mirrors as the best method of producing the shortest infra-red rays which penetrate the skin the deepest. He carried out treatment for chronic ulcers of the leg by using ultraviolet rays to clean them and then using elastoplast bandages following the treatments. In this way, scores of long-lasting ulcers have been healed.

It was known that the tonic effect of exposure of the skin to ultraviolet light produced a minimal degree of erythema which was followed by desquamation. Dr. Eidinow learned that the sensitivity of the skin remained present longer if he divided the body into four regions and gave two treatments a week allowing fourteen days to elapse before any one region was re-exposed. By doing this, he was able to reduce the amount of thickening of the horny layer and pigmentation and therefore made possible the absorption of more of the ultraviolet rays and more tonic effects with less exposure to the light. A technic similar to this is still used, namely, giving ultraviolet light for a relatively short length of time and allowing an interval between each course of treatment in order to prevent the thickening of the skin.

Dr. Eidinow also used ultraviolet rays for producing counterirritation and he thought exposure to ultraviolet rays an ideal method in the treatment of acute neuritis and fibrositis and in the treatment of painful joints and traumatic infusions. The technic of the treatment for these was to use intensive doses of ultraviolet rays which were sufficient to produce a strong erythemal dose over a region about 8 inches (20 cm.) square, above the painful part. Then he covered the region with an elastoplast bandage.

While Dr. Eidinow was in charge of the pathologic laboratory at St. John Clinic, he devised a method of making autogenous vaccines. These vaccines were made not by heating culture fluids but by exposing them between

a pair of mercury vapor lamps in a quartz flask which was kept rotating. Thus a thin layer of the fluid was exposed to the lethal effects of the rays. Eidinow believed that this method produced a better type of vaccine than the other methods did.

Among the other contributions to the field of light therapy Dr. Eidinow found evidence that the exposure of the skin to ultraviolet rays increased resistance to staphylococcal infection.

Aside from this work in light therapy and in pathology, Dr. Eidinow also took part in postgraduate courses given at the St. John Clinic and was highly appreciated by patients and students. He made contributions to the study of rheumatic diseases.

EXERCISE FOR ASTHMA

It is interesting to note that a controlled investigation on the use of remedial exercises in the treatment of asthma has been attempted. Whereas the use of exercise for asthma has been mentioned in the literature and a number of European contributions have been made along this line, little is known concerning it and in general little use is made of it in this country. Probably the reason for this is that most physicians do not know enough about remedial exercises for asthma to order them or do not have anyone sufficiently trained to administer them if they do know how to order them. Weiss in the article in this issue of the ARCHIVES has attempted to show in a small clinical study the indications for such procedures in this more or less intractable condition. Aside from the contributions of others mentioned by Weiss, Livingstone and Gillespie[1] concluded that good clinical results were obtainable in the treatment of fifty-two cases, improvement in two and no improvement in eleven cases of asthma. Bray[2] has stated that remedial exercises are necessary in all cases of asthma in which the attacks follow each other so rapidly that the overexpanded lungs do not have the opportunity to return to normal size.

The Asthma Research Council of King's College of London[3] was sufficiently impressed by the use of these remedial exercises to publish a small booklet describing them. This booklet is used as a guide for the patient and the physician. The recommendations of the Research Council on the use of these exercises are similar to those given by Weiss. However, the Research Council did not recommend any other physical procedures and Weiss has.

At times physicians seem startled when it is mentioned that exercise of any kind may be attempted in the treatment of asthma. However, when some of the physical aspects of the condition are considered, it is not inconceivable that remedial exercises may be of definite benefit. Of course, no claim is made that these physical procedures remove the cause of asthma, but they may partially control the condition or assist in compensating for it.

Many more controlled studies on the use of remedial exercises in asthma need to be done. Since there is enough evidence to indicate that such procedures may be of value, more physicians should make an effort to obtain a better knowledge of the procedures. To make an adequate study of the procedure will require well-developed technics, otherwise use of remedial exercise for asthma may fall into ill repute and have to be condemned, for if the exercise is done improperly, more harm than good may be done.

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2. Bray, G. W.: Recent Advances in Allergy (Asthma, Hay-fever, Eczema, Migraine, etc.). Ed. 3, Philadelphia, P. Blakiston's Son & Co., Inc., 1937, 517 pp.

3. Asthma Research Council, King's College, London: Physical Exercises for Asthma. Ed. 3, Chicago, Chicago Medical Book Company, 1939, 32 pp.

MEDICAL NEWS

Dr. Coulter Talks on Physical Medicine

Dr. John S. Coulter addressed the staff of the Gardiner General Hospital, Chicago, on the subject of physical medicine.

Colonel John R. Hall is the commanding officer of Gardiner. Captain M. R. Marshall is in charge of physical and occupational therapy.

Graduation at the Cleveland Clinic

We are pleased to announce that a class of 14 physical therapy technicians were graduated from the Cleveland Clinic Foundation on June 16. Dr. Walter J. Zeiter, head of the School of Physical Therapy, was chairman of the program which was as follows: Address of welcome, Mr. Edward C. Daoust; address, Lt. Col. Herbert C. Hodgkinson; awarding of certificates, Dr. Walter J. Zeiter; presentation of class pins, Miss Anna Wetterhuus; remarks by class president, Miss Gertrude Fouts; dedication to Dr. Lower, Miss Janet Crist; response, Dr. William E. Lower; awarding of navy certificates, Lt. John N. Martin, MC-USN.

Physical Therapy to Be Discussed at Annual Institute of Hospital Administrators

The Twelfth Annual Institute for Hospital Administrators will be held September 11 to 23, at the International House, University of Chicago and is being conducted under the auspices of the American College of Hospital Administrators with the cooperation of the University of Chicago, American Hospital Association, American College of Surgeons, American Medical Association and the Chicago Hospital Council.

Physical therapy will be the subject of the morning conference hour, 8 to 8:50, Thursday, September 21.

Marian E. Russell to Join Vocational Rehabilitation Staff

The appointment of Marian E. Russell, as Medical Social Consultant, is announced by Michael J. Shortley, Director, Office of Vocational Rehabilitation, Federal Security Agency, effective September 1, 1944.

As a member of the staff of Dr. Dean A. Clark, OVR Chief Medical Officer, Miss Russell will aid in the formulation and development of the medical social aspects of the vocational rehabilitation program, especially as they relate to the physical restoration of disabled persons. She will provide consultant and technical services for the Federal office and for the State Divisions of Vocational Rehabilitation and the State Agencies for the Blind. Review and evaluation of state plans for vocational rehabilitation, with respect to personnel and service standards and operations that are within the scope of the medical social consultant, will be a part of Miss Russell's duties on a continuous basis.

1944 March of Dimes

Announcing that the American people had contributed $10,973,491 to the 1944 Fund-Raising Appeal of The National Foundation for Infantile Paralysis, Basil O'Connor, Foundation president, declared that these donations will permit an expansion of the war against the children's enemy on the home front.

With epidemics or serious outbreaks now taking their toll in twelve of the states of the nation, Mr. O'Connor pointed out that the number of cases reported is already higher than for the comparable period last year when the country suffered its third worst epidemic.

"Funds from the 1944 March of Dimes," he said, "will permit the National Foundation not only to expand its aid to those who are stricken but also to open up new fronts of research which some day will pierce the defense of this disease and permit us to prevent it.

"Already 1,460,000 dimes are at work in the state of North Carolina where representatives of the National Foundation work day and night with state and local authorities to provide emergency aid, professional workers and equipment to meet the epidemic situation."

Dimes and dollars contributed by Americans also are at work in Kentucky, New York, Louisiana, Pennsylvania, Virginia, Tennessee, Ohio, Michigan, Maryland, Mississippi and Indiana where there are serious or threatening outbreaks, he added.

This year's donations almost doubled the former record of $5,527,590 set in 1943, Mr. O'Connor said, and the total comprised millions of small donations indicating that "almost every person in this country has had some part in creating the means of carrying on this mighty crusade.

"From Army and Navy bases half way around the world came donations from the brave fighters in our Armed Services," said Mr. O'Connor, which he considers "a mandate to us here at home not to neglect the fight against this home-front enemy while they are battling our foes abroad."

Mr. O'Connor praised the cooperation of the film industry, movie patrons, the sports world, the press, radio, war workers, school children,

labor, industry and "Mr. and Mrs. America in every conceivable station of life who aided in this vital movement."

Established Veterans Rehabilitation Centers

The Office of War Information recently announced that rehabilitation centers will be established at colleges and universities throughout the United States to provide job counseling and to arrange for vocational training and rehabilitation of disabled veterans of the present war. Brig. Gen. Frank T. Hines, administrator of veterans affairs and administrator of the retraining and reemployment administration of the Office of War Information, stated that arrangements have been completed for the opening of the first of the proposed centers at the College of the City of New York. The Veterans Administration will provide transportation to the centers, which will be near veterans' homes, meals and comfortable quarters at the centers, and medical service at the centers or during subsequent job training periods. Objective aptitude tests will be given the former servicemen to determine their abilities and interests and fit them into the occupations in which they are most likely to succeed. There will also be professional advice on selecting jobs.

Basil O'Connor Head of Red Cross

On July 13 President Roosevelt appointed Mr. Basil O'Connor, president of the National Foundation for Infantile Paralysis, New York, as chairman of the American Red Cross. George L. Harrison, LL.D., New York, had been serving as temporary chairman.

Rehabilitation Centers for U. S. Merchant Marines

The Office of War Information recently announced that more rapid certification of disabled seamen and officers of the U. S. Merchant Marine to vocational rehabilitation centers has been arranged by the War Shipping Administration. Disabled men who received their disability in line of duty may receive surgical and medical treatment, hospitalization, therapeutic treatment, artificial appliances, vocational guidance and training, maintenance during training and placement at federal expense. Speeding up of the procedure by which disabled seamen obtain rehabilitation benefits was made possible through the Service Division of WSA.

Rehabilitation Center for Blind

A rehabilitation center where blinded veterans of all branches of the service will receive extensive training to fit them for successful civilian lives recently opened at a former boys' school at Avon, Conn. All blinded servicemen will be sent to the center after they have received maximum benefit from medical and surgical treatment in service hospitals. The new installation, which was leased from the Avon school, will be known as the Old Farm Convalescent Hospital and is under command of Col. Frederic Thorne. The purpose of the center is to provide additional training for the blind in personal and social adjustment.

Thirty-Nine Enlisted WACS Become Commissioned Physical Therapy Aides

Thirty-nine enlisted members of the Women's Army Corps recently completed physical therapy training of almost a year's duration and were formally commissioned second lieutenant in the Medical Department of the Army. In nine army hospitals located in various sections of the country, these former WACS were ushered into their official status with varying ceremonies. Strength of the physical therapy organization is less than a thousand aides at present, but an active recruiting effort is being made to increase this number. Major Emma Vogel, director of physical therapy aides, Office of the Surgeon General of the Army, stated that "these former enlisted WACS are becoming officers of the Army at a time when their services are in urgent demand throughout the world."

Foreign Students at Northwestern

Dr. Fernando da Silva Nova of Bahia, Brazil and Dr. Jose Godinho de Oliveira of Lisbon, Portugal, are taking a postgraduate course in physical medicine at Northwestern University Medical School.

Dr. Sollmann Retires From Western Reserve

On June 30, the retirement of Dr. Torald Sollmann as dean, professor and head of the department of pharmacology was announced.

New Dean Appointed at Western Ontario

Group Captain G. E. Hall, Director of Medical Research for the Royal Canadian Air Force, has been appointed Dean of the Faculty of Medicine.

Association of American Medical Colleges to Meet in Detroit

The Hotel Statler has been selected as headquarters for the fifty-fifth annual meeting of the Association of American Medical Colleges, which will meet in Detroit, Michigan, October 23, 24 and 25, 1944.

New and Nonofficial Remedies Now Available

The 1944 edition of New and Nonofficial Remedies is now available. A companion volume that is also available is the Council on Pharmacy and Chemistry's Annual Reprint of Council Reports, which contains reports on articles declared unacceptable for inclusion in N. N. R. during 1943, articles omitted from N. N. R. and nineteen reports of general educational nature.

Physical Therapy Clinic in the Jungle

A physical therapy clinic was created out of makeshift materials by members of a hospital unit on the highway (Ledo Road) which Allied troops are building from Assam, India, through Burma to China. The chief of surgery in the unit saw the need for physical therapy for patients with fractures, contusions, and injuries of muscles, bones and joints, and as the hospital unit had no physical therapy facilities, a medical officer and an Army nurse, neither of whom had experience in physical therapy, were selected to devise the clinic. They took over some space in a bamboo basha and went to work to make equipment. An apparatus to provide dry heat was made from a crate with a socket for an electric light. A weight-lifting device for exercising arm and leg muscles was made from stirrups to which ropes and weights were attached. A Chinese officer contributed a bicycle for leg exercises. Old gasoline tanks were used for whirlpool foot and arm baths. A gasoline drum with a false bottom built a foot from the base was used to heat water; between the false bottom and the base an opening was made through which bamboo chips were set afire under the water. A rubber core of an old softball was used for hand and finger exercises.

The Chinese patients became interested in these devices and some gave the clinic articles which could be used for physical therapy treatments.

Stipulations—Agreements Between Federal Trade Commission and Promoters of Various Products

Following are abstracts of stipulations in which promoters of "patent medicines," medical devices and cosmetics have agreed, following action by the Federal Trade Commission, to discontinue certain misrepresentations in their advertising. These stipulations differ from the "Cease and Desist Orders" of the Commission in that such orders definitely direct the discontinuance of misrepresentations. The abstracts that follow are presented primarily to illustrate the effects of the provisions of the Wheeler-Lea Amendment to the Federal Trade Commission Act on the promotion of such products:

Min-O Ral. — That this mineralized water, when taken as directed, would be of any therapeutic value other than in the treatment of iron deficiencies or, when administered externally, would offer any benefit other than that of an inhibitory antiseptic or an astringent or styptic were advertising misrepresentations which Steve Ladas and Olga Spanpapolos, trading as the Min-O Ral Products Company, Detroit, agreed to discontinue in a stipulation which they entered into with the Federal Trade Commission in March, 1943. Further, they agreed to cease representing that the product provides an adequate treatment or permanent or temporary relief for headaches, kidney or bladder disorders, arthritis, gout, or stiffening of the joints, or that it will overcome fatigue, provide energy, correct weakness or underweight, or promote resistance to infections or run-down conditions resulting from impoverished blood, improper elimination or any other cause.

Nu-Yorkers' Infra-Red Scalp Cap and Nu-Yorkers' Infra-Red Beauty Mask. — A. O. Dyke, Miami, Fla., trading as The Nu Yorker, stipulated with the Federal Trade Commission in March, 1943 that in the sale of these devices he would cease making the following misrepresentations in his advertising: That either the Cap or the Mask constitutes an adequate treatment or dependable relief for sinus congestion or head colds, has any alkaline or antiseptic effect, is of value in treating nervous diseases, destroys germ life or has any effect on the action of the skin other than as a temporary stimulant of the flow of blood or perspiration. He further agreed to cease using the word "Infra-Red" or other words of like meaning which might give the impression that any material heating effect resulting from use of these devices is produced by infra-red radiation; and such phrases as "low, medium and high heat," which might imply that the devices are capable of maintaining three different, distinct degrees of heat. —J. A. M. A. **124**:666 (March 4) 1944.

Cease and Desist Orders—Abstracts of Certain Federal Trade Commission Releases

The work of the Federal Trade Commission, in helping to protect the public against misrepresentation or fraud in the medical as well as other fields, has been greatly extended by the provisions of the Wheeler-Lea Amendment to the Federal Trade Commission Act. The Food, Drug and Cosmetic Act of 1938 increased the Food and Drug Administration's control of the advertising claims and statements made on the label of a medicine or on the carton or in the accompanying leaflet, whereas what might be termed collateral advertising, that which appears in circulars, newspapers and magazines and over the air, comes more actively under the purview of the Federal Trade Commission by virtue of the Wheeler-Lea Amendment.

The Journal has at various times commented on the activities of the Federal Trade Commission in this connection, even before the Wheeler-Lea Amendment gave it its added rights. In some cases the Commission may accept from the person or concern involved a stimpulation that the objectionable practices or claims cited will be discontinued. In other cases the Commission issues what is known as a Cease and Desist Order, in which the individual, manufacturer or distributor cited is ordered to cease and desist from practices which have been declared objectionable. In some cases the claims cited have been discontinued by the firms several months (or even longer) before the issuance of the order. Abstracts of some of the orders issued in 1943 follow in this form: name of product, name of distributor, date of issuance of complaint, date of issuance of Cease and Desist Order and terms of order.

Domestic Short-Wave Diathermy. — Max E. Heyman and Maude S. Jaret, trading as Domestic

Diathermy Company, New York; complaint issued April 16, 1943; order issued June 21, 1943. Order directed these respondents to discontinue the following advertising misrepresentations: That their device is safe or harmless or that, when used by unskilled laymen in the treatment of self-diagnosed conditions, it constitutes a competent treatment of, or remedy for, rheumatism, arthritis, sciatica, neuralgia, lumbago, sinus trouble, neuritis, laryngitis, tonsillitis, bursitis, asthma, female complaints, and some other things; that its use will renew youthful vigor and establish bodily efficiency and resistance to disease, and that the treatment which the device provides is similar to that known as "friendly fever." The order further prohibited dissemination of any advertising which would fail to reveal clearly and conspicuously that this mechanism is not safe to use for any condition unless a competent medical authority has determined by diagnosis that diathermy is indicated and has prescribed the frequency and rate of application of the treatments and the user has been adequately instructed by a trained technician in the use of the device. — J. A. M. A. **125**:808 (July 15) 1944.

Elsaco Mineralized Water. — Electrovita Sales Company of Ohio, Norwalk, Ohio; complaint issued Oct. 26, 1942; order issued August 6, 1943. Order directed respondent to cease representing that the product has any beneficial effect other than a tendency to decrease stomach acidity; that it will neutralize any acid condition of the blood stream or rid the body of an acid condition; that it has any beneficial effect in activating the kidneys; that it will supply mineral deficiencies or essential mineral salts needed to keep the body chemistry in balance, or act as an oxidizing agent; that it has any value in treating asthma, kidney or bladder trouble, or any of the numerous diseases named in the advertising, or any other human ailment. The Commission found that the product was essentially the same as ordinary tap water, except for an added amount of calcium hydroxide which could not be obtained by any electrolytic method, but simply was physically added in the course of processing the water. — J. A. M. A. **125**:808 (July 15) 1944.

Rex Diathermy Corporation. — It is ordered that the respondent, Rex Diathermy Corporation, a corporation, and its officers, representatives, agents and employees, directly or through any corporate or other device, in connection with the offering for sale, sale, or distribution of respondent's device designated "Rex Diathermy Machine," or any other device of substantially similar character, whether sold under the same name or under any other name, do forthwith cease and desist from directly or indirectly:

1. Disseminating or causing to be disseminated any advertisement, by means of the United States mails or by any means in commerce, as "commerce" is defined in the Federal Trade Commission Act, which advertisement represents, directly or by implication:

(a) That said device, when used by unskilled laymen in the treatment of self-diagnosed conditions, constitutes a competent or effective treatment of or remedy for rheumatism in its various forms in all parts of the body, arthritis, bronchitis, sciatica, lumbago or other similar diseases.

(b) That said device constitutes a competent or effective treatment for the alleviation of pain resulting from diseases and ailments of the human body unless specifically limited to conditions which do not involve acute inflammatory processes, glandular structures, or the special senses.

(c) That diathermy treatments are used by all doctors and in all hospitals for the treatment of diseases or diseased conditions.

2. Disseminating or causing to be disseminated any advertisement by means of the United States mails, or by any means in commerce, as "commerce" is defined in the Federal Trade Commission Act, which advertisement fails to reveal clearly and conspicuously that said device is not safe for use for any condition unless and until a competent medical authority has determined, as a result of diagnosis, that the use of diathermy is indicated, has prescribed the frequency and rate of application of the treatments, and the user has been adequately instructed by a trained technician in the use of such device.

3. Disseminating or causing to be disseminated any advertisement, by any means, for the purpose of inducing, or which is likely to induce, directly or indirectly, the purchase of commerce, as "commerce" is defined in the Federal Trade Commission Act, of respondent's device.

BOOK REVIEWS

TECHNIC OF ELECTROTHERAPY AND ITS PHYSICAL AND PHYSIOLOGICAL BASES. By *Stafford L. Osborne,* M.S., Ph.D., Assistant Professor, Department of Physical Therapy Northwestern University Medical School, and *Harold J. Holmquest,* B.S., B.S. (M.E.) Lecturer in Applied Physics, Department of Physical Therapy, Northwestern University Medical School, Chicago. Cloth. Pp. 780, with 240 illustrations. Price, $7.50. Springfield, Illinois: Charles C. Thomas, 1944.

This text provides a sound physical and physiologic rationale for the technic and application of electrotherapy. The material presented bears a comparable relation to the scientific practice of electrotherapy that a text on pharmacology does to the rational use of drugs for the treatment of disease. It is for those who wish to know the why of electrotherapy, for those who wish to base their applications and technic on sound physical and physiologic principles. It is not an alphabetically arranged compendium of diseases and methods of treatment, but a work that provides the basic principles which enable the physician to prescribe electrotherapeutic treatments intelligently, to devise technics adapted to the effective treatment of the pathology.

The subject matter is divided into four parts: (1) the effects and technical application of direct current; (2) electrical muscle stimulation; (3) radiation; (4) high frequency currents.

A noteworthy feature of the book is the fact that throughout an attempt has been made to clarify the existing and somewhat confused nomenclature of electrotherapy, for instance, direct current in place of galvanism and tetanizing current in place of faradic current.

The importance of a written prescription for electrotherapy is stressed and a sample prescription is given with each application discussed. Instructive elementary laboratory experiments, requiring a minimum of simple apparatus are given for students to perform.

The book is technical in nature but the more technical discussions are given in footnotes which may be omitted on the first reading without destroying the continuity or clarity of the text. However, physical principles and mathematical formulation given in the footnotes are as essential to the full understanding of electrotherapy as the principles of chemistry given in a text on pharmacology. Hence, it will be found advantageous for more serious students of electrotherapy having the requisite scientific background to study thoroughly the footnotes.

A book such as this is possible by a combination of a physiologist thoroughly trained in physiology and physical therapy technic with a physicist who has devoted himself to the study of medical physics. This book is recommended to physicians for self instruction in the rationale of electrotherapy and for those prescribing it so that they can do it with greater effectiveness. It is also recommended as a textbook for medical students receiving lectures in electrotherapy.

HEALTH AND HYGIENE. A Comprehensive Study of Disease Prevention and Health Promotion. By *Lloyd Ackerman,* Ph.D., Western Reserve University. Cloth. Price, $5.00. Lancaster, Pa. The Jaques Cattell Press, 1943.

This book is a comprehensive study of all aspects of disease prevention and health promotion. It is divided into eight parts, respectively dealing with the introduction, the evolution of health concepts and health practices, the evaluation and importance of health concepts and practices, parasitism and hypersensitiveness, hygiene of the mouth, the hygiene of nutrition, hygiene of the emotions and the intellect, the hygiene of mating, exogenous poisons and physical agents and their relations to health.

As an example of how the author has organized the material presented concerning one particular field, the final chapter in the book, "Heat, light, and sound in their relations to health, disease, and death," may be cited. The opening paragraph reads, "The remaining physical agents — heat, light, and sound — are related to health in two distinct ways. They may act as beneficial agents essential for normal living, and they may be exceedingly harmful. Much depends on the quality, quantity, and intensity of the agent when contact is made with the body." Following this, the author discusses, under the heading of "Heat and cold in their relations to energy metabolism," biokinetic temperature limits, normal body temperatures, heat balance, the production and absorption of heat by the body, the loss of heat from the body, automatic thermoregulation, the ill effects of heat and cold, the artificial regulation of heat loss and heat absorption. This chapter continues with such headings as "Short applications of heat and cold," "Light and its effects on the skin," "Vision," "Sound and hearing" and "Noise" — each of these having its numerous subheadings.

A mere listing of the subjects discussed in this book does not give an adequate picture of its contents, for it is a careful, detailed study of the topics named. It is a volume written for laymen. However, it is a text which might interest sociologists, biologists and other scientists more than those without scientific training. Although it is not written in strict medical terminology, neither

is it written in the simplified vocabulary sometimes used in medical books for lay people.

It is obvious that a great deal of time and thought has been spent in the writing of this book, from the standpoint both of its contents and of its organization.

This is not a medical text nor would it be used as a reference book by physicians but it certainly can be recommended as interesting reading to physicians or to laymen interested in medicine. It shows, not only care in organization, but also craftsmanship in writing.

THE AMERICAN ILLUSTRATED MEDICAL DICTIONARY. By *W. A. Newman Dorland*, A.M., M.D., F.A.C.S., Lieut.-Colonel, M.R.C., U. S. Army; Member of the Committee on Nomenclature and Classification of Diseases of the American Medical Association; Editor of "American Pocket Medical Dictionary." With the Collaboration of *E. C. L. Miller*, M.D., Medical College of Virginia. Cloth. Pp. 1668 with 885 illustrations, including 240 portraits, 20th Edition. Price, $7.00 plain; $7.50 indexed. Philadelphia: W. B. Saunders Company, 1944.

The new edition of this well known medical dictionary is made more valuable by the addition of 2,500 new words. Veterinary and dental terms are given. The terminology as usual, conforms to the standards of the American Medical Association and other scientific bodies. The definitions are fully stated. It tells how to pronounce every word. The typographic arrangement makes it easy to find any word. Signs and symptoms and methods of treatment are clearly stated. Methods of treatment are clearly explained. A dosage table covers 7 pages. Abbreviations are clearly explained. Descriptions and indications for the use of serums, operations and medical biographies are given. The illustrations are good and include portraits of great physicians of the past.

It can be highly recommended to every physician as the newest and best medical dictionary.

THE MANAGEMENT OF NEUROSYPHILIS. By *Bernhard Dattner*, M.D., Jur. D., Associate Clinical Professor of Neurology, New York University Medical College. With the Collaboration of *Evan W. Thomas*, M.D., Assistant Professor of Medicine and Assistant Professor of Dermatology and Syphilology, New York University Medical College; and *Gertrude Wexler*, M.D., Instructor in Dermatology and Syphilology, New York University Medical College. Foreword by *Joseph Earle Moore*, M.D., Associate Professor of Medicine, Johns Hopkins University. First Edition. Pp. 420, 40 figures, charts and tables. Cloth. Price, $5.50. New York: Grune & Stratton, Inc., 1944.

This book is divided into two parts: Part I, Introduction, technic of removal of spinal fluid, technic of examination of spinal fluid, significance of spinal fluid changes, spinal fluid syndromes. Part II, Methods of treatment, applications and results of various therapeutic measures, prophylaxis and pathogenesis of parenchymatous neurosyphilis, conclusions.

This timely publication skillfully outlines the present day accepted management of neurosyphilis patients, describing the syndromes associated with the different types of neurosyphilis and at the same time discussing the significant references from the literature.

The book is not only of particular interest to syphilologists but of general interest to all physicians, including those specializing in physical medicine, regarding the evaluation of the present day diagnostic measures and available treatment methods of neurosyphilis. In the past continued emphasis has been placed on the "specialist" and his responsibility in the diagnosis of neurosyphilis and its treatment but not enough emphasis on the responsibility of general practitioners and physicians in other branches of medicine to recognize neurosyphilis and to see that such patients are placed under proper management. A better recognition of the different stages of neurosyphilis and the associated pathology and appraisal of the results of treatment would be most helpful to the physician who, at times, finds himself faced with the responsibility of supervising the treatment of neurosyphilis with fever therapy. This is plainly pointed out in this text. Attention is also called to the marked importance of proper evaluation of the laboratory tests performed on the spinal fluid.

Syphilologists, in fact, all physicians have recognized the outstanding research and teaching of Wagner-Jauregg. His stimulus in the therapeutic use of fever therapy in neurosyphilis has been perpetuated in this country. Very few people know that Dattner was Wagner-Jauregg's assistant in the Vienna Clinic, where he acquired a wealth of experience in the handling of neurosyphilis patients.

The author's clear and concise style of presentation is particularly appealing. He has deftly correlated the research and therapeutic developments published on this subject to date.

THE HISTORICAL DEVELOPMENT OF RECOVERY'S SELF-HELP PROJECT; GROUP PSYCHOTHERAPY; LECTURES TO RELATIVES OF FORMER PATIENTS. By *Abraham A. Low*, M.D., Founder and President of Recovery, the Association of Former Mental Patients. Price, $1.25. Paper. Chicago: Recovery, Inc., 1943.

This is a series of three paper-bound books in which the author sets forth the historical background and the treatment and after care of mental and nervous patients.

The first volume traces the change in the attitude toward and treatment of such patients by the organization known as Recovery, the Association of Former Mental Patients, from its inception on November 7, 1937. It would appear that one of the important features of the program of this association is to overcome the stigma attached to mental diseases by the patient himself,

by his family and by the community at large. "The historical development of Recovery's self-help project" explains in detail how the association was organized and its financial problems. It contains case histories of patients who were helped by the association and describes legislative work done by this group.

The second volume entitled, "Group psychotherapy," describes actual instances of treatment. It is the author's contention that, because of the lack of properly trained physicians, the lack of funds and the overcrowding of mental institutions, patients do not receive adequate psychotherapy. As a result, he strongly advises and approves of group treatment and has found that good results are obtained in this manner both from the contact between physician and patient and between patient and patient. For instance, the physician will attempt to draw out a patient by questioning him concerning his problems. In replying, the patient may attempt to help in the solution of his own problem. The rest of the group present will from time to time volunteer to express opinions or solutions for the problem under discussion. The author finds that in this way the patient who is the subject is helped and that meantime the rest of the patients are helping themselves.

In the third volume, the author addresses himself most directly to the relatives of former mental patients. He stresses the importance of providing a normal, health environment for the former patients. Many relatives are over solicitous or provide a quarrelsome, conflicting background, which often causes relapses. There are numerous instances given in this book of how patients returning to their homes and jobs fully recovered have broken down under improper treatment by relatives and friends.

These books are to be recommended to all physicians, nurses, social workers and physical and occupational therapists who are concerned with the treatment and care of mental and nervous patients. The theories expounded in this series should be of interest to anyone concerned with or interested in this type of patient.

PRINCIPLES AND PRACTICES OF INHALATIONAL THERAPY. By *Alvan L. Barach*, M.D., Associate Professor of Clinical Medicine, Columbia College of Physicians and Surgeons; Assistant Attending Physician, Presbyterian Hospital. Cloth. Price, $4.00. Pp. 315 with 59 illustrations. Philadelphia, London, Montreal: J. B. Lippincott Company, 1944.

Inhalational therapy has become an important part of the modern practice of medicine and the author has contributed much to this development. His volume offers a clear-cut, scholarly presentation on the physiologic basis and methods of inhalation therapy. These are discussed in 36 chapters and along three major themes: Chapter 1 portrays the historical and physiologic background of inhalational therapy; chapters 2 to 32 present the pathologic physiology of the various clinical conditions, the specific indications for treatment and the choice of method of inhalational therapy; chapters 34 to 38 deal with the methods and equipment of inhalational therapy. The 59 illustrations are well chosen. There is an ample bibliography. Dr. Barach's volume fills a real need for an authoritative and practical guide in a constantly growing field of therapeutics and will be welcomed by all interested physicians, technicians and nurses.

TROPICAL NURSING. By *A. L. Gregg*, M.A., M.D., M.Ch., B.A.O. (Dublin), D.T.M. & H. (Lond.), L.M. (Rotunda Hospital); member of Associate Staff and Lecturer to Nurses at the Hospital for Tropical Diseases, London; Lecturer on Tropical Diseases, Westminster Hospital Medical School. Cloth. Pp. 185 with 13 illustrations. Price, $3.00. Second Edition, New York: Philosophical Library, 1944.

The author has performed for the nursing profession a distinct service in preparing this volume on tropical nursing. Concise and practical books such as this one are few and far between. The author wisely observes that although "good nursing is the same at all times and in all places it has . . . to be adapted to necessities and circumstances." Adaptation to conditions in the tropics, however, requires not only good general nursing, but expert specialized service. It is the purpose of this volume to aid an already efficient nurse in the art of caring for tropical diseases. Many of these are vastly different from those the nurse has hitherto encountered.

After offering some practical advice in Section I on how to keep fit in the tropics, in Section II the author proceeds to discuss the main diseases prevalent in those regions. An attractive feature of the book is the alphabetical arrangement for quick reference. Each disease, such as dengue fever, trypanosomiasis or malaria, is discussed under such subheadings as cause, infection, pathology, clinical course, complications, diagnosis, treatment and prophylaxis. The writer endeavors to create in the nurse a feeling of confidence in order that she may better be able to deal with the many difficult and perplexing situations that arise. Although he does in no wise encourage an attitude of independence, he does, nevertheless, encourage the nurse to go to the limit of her professional ability while faithfully carrying out the physician's orders. Section III is entitled "Technique." It deals with such important items as composition of the blood in health and disease, how to make blood films, how to prepare for blood transfusions. It explains the nature of fractional test meals, how to give various types of injections, etc. The remaining portion of the book contains instruction on how to care for the eyes, and a glossary of medical terms. This volume is recommended to all who are called on to live or nurse in the tropics.

THE ROMANCE OF MEDICINE. The Story of the Evolution of Medicine from Occult Practices and Primitive Times. By *Benjamin Lee Gordon*, M.D., Member American Association of the History of Medicine, Attending Ophthalmologist to the Shore Memorial Hospital, Somers Point, New Jersey and to Atlantic County Hospital for Tuberculosis, Northfield, New Jersey, Authorized Medical Examiner for Civil Aeronautics Administration, Department of Commerce, Washington, D. C. Cloth. Pp. 624 with illustrations. Price, $5.00. Philadelphia: F. A. Davis Company, 1944.

Most medical histories confine themselves to a series of sketchy or thorough biographic studies of the leading lights of medical progress, from the legendary Aesculapius to the most recent medical authority. Primitive medicine is usually brushed aside in a few conglomerate pages, ignoring the basic fact that medicine had its birth with the first man when he consciously or unconsciously recognized the blessings of health and life and strived to preserve them.

Gordon, in this book, traces modern medical and non-medical facts, customs and folklore, to ancient medical concepts. He shows that primitive man preferred a rational interpretation of natural events, and indulged in mystery only when such occurrences were otherwise unexplainable. The rude philosopher of antiquity never left a problem unsolved. When a proposition was above his range of knowledge, he resorted to his imaginative and intuitive powers to solve it. He removed the problem from the province of physics and placed it in the realm of metaphysics believing that nothing is beyond the powers of supernatural forces.

There is an excellent bibliography at the end of the book. The author presents a readable, well illustrated and comprehensive account of the ideas of life in the state of health and disease, of our savage, semi-civilized and civilized ancestors, what their thought was on embryology and anatomy, their conception of the controlling forces governing the human mechanism, their concepts of mind and soul, and the role it was assumed to play in the human economy. There is an excellent chapter on Hydrotherapy and Other Healing Measures, reminding us of the importance of water to the ancients for its therapeutic value and for its spiritual virtues.

This book can be recommended as throwing a new light on a subject which, for the most part, has been hitherto analyzed inadequately or considered with antiquated prejudice.

ESSENTIALS OF DERMATOLOGY. By *Norman Tobias*, M.D., Senior Instructor in Dermatology, St. Louis University, Assistant Dermatologist, Firmin Desloge and St. Mary's Hospitals; Visiting Dermatologist, St. Louis City Sanitarium and Isolation Hospital. Second Edition. Cloth. Price, $4.75. Pp. 497 with 143 illustrations. Philadelphia: J. B. Lippincott Company, 1944.

This book presents the subject of dermatology completely and concisely without the sacrifice of detail. Histologic descriptions and theoretic considerations have been reduced to a minimum, the newer facts have been incorporated, differential diagnosis is stressed and diagnostic features are emphasized. Each disease is discussed from the standpoint of internal medicine. In this second edition many paragraphs have been rewritten and some 19 photographs have been added. Vitamin and sulfonamide therapy, the chapter on physical therapy and the pathology of several dermatoses have been elaborated. The latest accepted treatments are described and the obsolete omitted. Although military dermatology is not discussed separately, the common diseases in this group, such as the animal and vegetable parasitic diseases, pyodermas and plant dermatitis are included. This book should be in the library of general practitioners and medical students.

HEART DISEASE. An Elementary Reference for Physicians. By *Robert S. Berghoff*, M.D., F.A.C.P., Clinical Professor of Medicine, Loyola University School of Medicine, Director of the Heart Station, Mercy Hospital, Loyola University Clinics and Chairman of the Board of Advisors in the Department of Public Health. Paper. Pp. 63. Free. Springfield, Illinois: Department of Public Health, 1944.

This brief, simple and elementary book on heart disease is prompted by the exigencies of war, and is an extension of the service rendered by the postgraduate committee of the Illinois State Medical Society to the members of the medical profession of Illinois. The average physician remaining in civil practice is hard pressed and in addition to his own duties and responsibilities, has assumed the load of his confreres who have entered the military service. Books similar to this on various specialties and subspecialties in medicine and surgery are being compiled and will be sent to the physicians of Illinois through the joint auspices of the post-graduate committee of the Illinois State Medical Society and the Department of Public Health of the State of Illinois.

PHYSICAL THERAPY ABSTRACTS

The Neuropsychiatrist and Convalescent Training Program of Army Air Forces. Albert A. Rosner.

Bull. U. S. Army Med. Dept. **78**:93 (July) 1944.

The establishment of a training program for convalescent patients in A. A. F. hospitals is provided for in Memorandum No. 25-9, War Department, Headquarters Army Air Forces. An A. A. F. letter dated March 10, 1943, announced that the operation of this program "definitely decreased morbidity and hospital readmission and increased the effectiveness of soldiers returning to duty." The patient's response to the program was excellent and morale was greatly benefited. On the assumption that morale and mental hygiene are largely synonymous, an attempt was made to combine the activities of the mental hygiene department of the station hospital, Dale Mabry Field, Florida, with that of the more general problem of convalescent and postconvalescent morale.

The recreation and reconditioning program at Dale Mabry Field was considered as an experiment in mental hygiene. Still in its earliest development stages, its full value was still to be demonstrated. Nevertheless, it provided the neuropsychiatrist an interesting and provocative method of approach to the vital question of military morale. The recreation and reconditioning program affords the military neuropsychiatrist an opportunity to provide from his own experience a full measure of useful advice and aid in the execution of what is certainly a necessary innovation in station hospitals.

Reconditioning Problem at Oliver General Hospital. S. E. Bilik.

Bull. U. S. Army Med. Dept. **78**:81 (July) 1944.

All branches of the military service are stressing the reconditioning of men who are convalescing from illness or injury. Prolonged hospitalization leads to physical and emotional deterioration if nothing is done to combat the boredom, weariness, atony, atrophy and general debility. A soldier's rehabilitation is not complete until he regains maximum strength, ruggedness, ability to participate in military tarining and the spiritual qualities which are called morale.

The reconditioning program aims to include all patients grouped as follows: Class 1, fully recovered convalescents able to participate in grueling exercise; Class 2, fully recovered convalescents requiring intelligently graded training to prepare for progression to Class 1; Class 3, ambulant ward patients, handicapped to varying degrees by the residue of their injury or illness; Class 4, bedridden patients or those able to get around the ward only with considerable difficulty. With these classifications in mind, three distinct programs were set up: (1) reconditioning of Class 1 and Class 2 patients; (2) reconditioning of ward patients; (3) reconditioning of officer patients.

There is a completely equipped athletic field suitable for drilling, conditioning exercises and competitive sports. An adjoining field is equipped with tables suitable for sun bathing and for abdominal and back exercises. Skirting this field is a modified obstacle course. Nearly all the equipment on both fields was constructed by the convalescents out of salvaged materials left by the contractors after completion of the hospital buildings.

The detail of reconditioning of the ward patients is presented. The participation of officer patients is voluntary. In conclusion the author states that the reconditioning of hundreds of patients is a vast and complex task. It requires tenacious perseverance and profound belief in the cause to achieve the desired results.

Refrigeration Anesthesia in Surgery. V. Richards.

Ann. Surg. **119**:178 (Feb.) 1944.

Richards reports 2 unusual experiences with refrigeration of limbs. In the first case refrigeration of a limb, the seat of an unsuccessfully removed arterial embolus, was not gratifying. Although cooling of the anoxic limb had retarded the metabolic needs of the tissues and prevented gross necrotic changes, it had not prevented gangrene, it caused the available collateral blood vessels to contract and it had retarded both the stimulus for and the rate of growth of new collateral channels. In the second case the limb was refrigerated and then allowed to return slowly to room temperature. The author is inclined to doubt that refrigeration anesthesia may be used successfully in lengthy reconstruction operations on normal limbs. This skepticism would apply equally to the debridement and preservation of traumatized extremities. Once a tourniquet is applied to a limb, even though the tissues distal to the tourniquet should be cooled, irreversible changes in the specialized nerve and muscular tissues are apt to occur unless the well established principles governing the use of a tourniquet are observed. Many of the advocated advantages of refrigeration seem untenable. Bacterial growth is retarded by refrigation, but so also is the tissue response to inflammation, and on release of the cooling the inflammatory reaction may even be aggravated. In an injured extremity with an intact blood supply the application of a tourniquet is extremely hazardous for it increases immeasurably the subsequent shock by adding to trauma the effects of tissue

asphyxia. Refrigeration anesthesia has decided advantages in the control of shock, hemorrhage and infection if sacrifice of the limb has been decided on.

A Comparative Study of Ultraviolet Irradiated Ergosterol (Steenbock Process) and Electrically Activated Ergosterol (Whittier Process). A Preliminary Report. R. Garfield Snyder; Willard H. Squires; John W. Forster, and Emmanuel Rudd.

J. Lancet **64**:26 (Jan.) 1944.

Numerous conflicting reports on the toxicity and efficacy of massive doses of vitamin D in the treatment of arthritis have appeared in the literature since Dryer and Reed reported their results in 1935.

Definite differences have been demonstrated in the relative toxicity and therapeutic effectiveness of different types of vitamin D. The therapeutic value and toxicity of ultraviolet irradiated vitamin L, in doses ranging from 150,000 to 300,000 units per day, in the treatment of chronic arthritis were studied in a group of thirty patients during a period of twelve months. Eighty per cent of the patients were unable to tolerate the required dosage. The toxic manifestations were so severe as to necessitate cessation of the medication. Seventy-seven per cent of the cases were not benefited even after six months of treatment and fifty-seven per cent refused to continue the medication. Definite objective improvement was observed in only five of the patients (17 per cent). The results obtained by the authors with the use of ultraviolet irradiated vitamin D agree with those reported by Abrams and Bauer and other investigators who studied this form of antirachitic agent. They are in sharp contrast, however, to the results obtained with electrically activated ergosterol (Ertron). With electrically activated ergosterol (Whittier Process), carefully controlled investigations during the past six years have definitely demonstrated the safety and therapeutic effectiveness of this form of medication.

Herpes Following Fever Therapy. R. L. Sutton, Jr.

Bull. U. S. Army Med. Dept. **78**:115 (July) 1944.

Mechanically induced fever, 106 F. rectally, maintained for seven hours, has been effective in the treatment of chemoresistant gonorrheal infection. During the eighteen hours preceding hyperthermia, the patients received 8.0 Gms. of sulfathiazole. Herpes developed within the next few days in many of them. A study was made of 60 patients to determine, if present, any relation between the person's history of herpetic affection and the incidence and severity of herpes that occurred after fever therapy. Individuals with recurrent herpes appeared, statistically, to suffer more severe postpyrexial herpes than individuals who had never, or only rarely, had herpes. Patients who after their first fever treatment developed herpes seldom developed herpes after a second fever treatment given within two weeks.

Construction of a Convalescent Walker. C. S. Bauman.

Bull. U. S. Army Med. Dept. **78**:119 (July) 1944.

The neurologic service at an overseas general hospital requested from the medical supply officer a device that would enable or assist a post operative patient to exercise himself and regain full use of his lower extremities. A self-propelled device was desired in order to eliminate the need of a ward man who heretofore was necessary to support the patient when he started to walk again.

Detail drawings and descriptions are given from which to construct such an apparatus. The convalescent walker was made as short as possible in order to be maneuverable in the close confines of a crowded ward. It appears to fill the requirements of the neurologic service.

The Electroshock Convulsive Syndrome. Paul H. Wilcox.

Am. J. Psychiat. **100**:672 (March) 1944.

Convulsions induced by electrical stimulation of the head follow a fairly constant pattern on repetition and in different patients.

The evidence that the electroshock convulsion syndrome is the result of integrated activity of a cortical area near the fissure of Rolando and is essentially a pyramidal tract syndrome can be summarized as follows: Electrical shocks given near the fissure of Rolando are the most efficient in producing convulsions; the tonic pattern looks like the result of generalized excitation of the motor cortex; pyramidal tract impairment modifies the convulsive pattern; extrapyramidal tract disease does not modify the convulsive pattern; autonomic excitation appears to be a secondary phenomenon; no simple medullary syndrome occurs. The medulla seems to be responding differentially to stimulation from above; the "trigger zone" of the electroshock convulsion syndrome responds to various strengths and durations of iterative stimuli with summation to the threshold convulsive dose typical of a strength - duration curve.

Anticonvulsant drugs such as sodium amytal act primarily on the higher cortical levels of integration. They also increase the convulsive threshold. Therefore, the "trigger zone" is probably at a fairly high level of cortical integration.

The Action of Electric Blankets. G. Malcolm Brown, and K. Mendelssohn.

Brit. M. J. **4341**:392 (March 18) 1944.

In a previous communication the action of radiant heat cradles was recorded. Continuing this work on heating apparatus in clinical use, the authors have carried out an investigation on the action of electric blankets. These two methods of supplying heat to the body differ much in their physical aspects, for the cradle acts mainly by heat radiation, whereas heat from the electric blanket is conveyed to the patient almost exclusively by conduction.

The electric blanket has advantages which recommend it for certain clinical uses. It is safe and causes no discomfort at ordinary heating rates. When used to produce artificial hyperpyrexia there have been cases of fire due to a fault in the heating element, but we know of nothing similar occurring in ordinary use. It requires little supervision. None of the volunteers complained of any skin discomfort, and the risk of burns is less than with an unshielded cradle. The shape and the position in the bed are but a small inconvenience to the nursing staff. A most important disadvantage, however, is the long period taken to reach the maximum temperature and the lack of variability of control. With the cradle it is possible to raise the temperature of the air around the patient's body quickly to a given degree and to maintain it at that level for an indefinite time. Even at its maximum temperature the electric blanket raises the body temperature only half as quickly as the cradle. The cradle is the better instrument when heat is required quickly and in large quantities. When forethought is possible and less heat is required the blanket is to be preferred. To warm the waiting bed for the patient or to keep him warm out of doors in cold weather the blanket should be used, but when heat is prescribed for the victim of an accident the heat cradle is indicated.

The Clinical Significance of Rh Factor With Comments Concerning the Laboratory Problems. Roy R. Kracke, and William R. Platt.

Ann. Int. Med. **20**:569 (April) 1944.

In 1940, Landsteiner and Wiener discovered the existence of a new blood group factor in man following the injection of rabbits with the blood of the Macacus rhesus monkey. The serum of the immunized rabbits clumped not only the blood cells of the Rhesus monkeys but also the blood of about 85 per cent of human beings irrespective of their blood groups, thus revealing the presence in man of a new blood factor designated as Rh, because it was first found in the Rhesus monkey.

A summary of existing knowledge concerning the Rh factor is presented. Four cases illustrating variable Rh problems are presented. Methods for obtaining and preparing anti-Rh serum are described in detail. The importance of having donors ready and classified for the Rh factor is obvious; in fact, many workers in this field use Rh negative donors routinely for postpartum patients and patients having transfusion reactions of any kind unless there is time to study the case thoroughly and the Rh factor as a source of danger can be excluded. Sera for testing for the Rh factor can be obtained (1) by purchase, (2) from patients who have had transfusion reactions caused by the Rh factor, (3) and from the mothers of erythroblastotic infants. The agglutination reactions with anti-Rh sera, even those of high titer, are much weaker than those of ordinary blood group sera and may not show up at all by the ordinary slide technic.

The modified compatibility test should be used in all instances in which the Rh disturbances may be suspected.

Multiple Peripheral Neuritis Occurring With Sulfonamide Therapy. M. A. Blankenhorn.

Ann. Int. Med. **20**:430 (March) 1944.

Multiple peripheral neuritis occurring with sulfonamide therapy may become an important consideration as such therapy is extended and as the drugs are used prolongedly in infections. The incidence of such neuritis at present is difficult to ascertain. Only isolated cases are reported. It is said that the complication is rare and that it may follow prolonged use and large dosage.

Six cases of multiple peripheral neuritis occurred among the 600 treated with sulfonamide drugs. In five instances the total dose was 50 Gm. or more; 6 Gm. per day were administered by mouth. The largest dose was 197 Gm. and the smallest was 36 Gm. Blood levels of the drugs were not unusual. Other factors, mainly alcoholism or deficiency states, may have contributed. Eight cases are reported showing signs of neuritis before sulfonamide drugs were given. Of these patients with mild neuritis, only one was made worse by sulfonamide treatment. Vigorous treatment with vitamins and diet may have prevented the neuritis from becoming worse.

Electric Shock Therapy for Psychosis With Special Reference to Dementia Paralytica. M. C. Peterson.

Proc. Staff Meet., Mayo Clin. **19**:281 (May 31) 1944.

Of the various forms of shock therapy in use, electric shock not only is the easiest to apply but is probably the safest and the most effective. Electrodes are placed on both temples and the current applied. The apparatus used operates on 105 to 125 volts with 50 to 60 cycles per second. It is connected with the ordinary house current. The dosage used has varied from 300 to 650 milliamperes. The time of application has varied from 0.15 second to 0.5 second.

The initial dose used by the author is 500 milliamperes applied for 0.2 second. If a convulsion is not induced, the current is increased. If the seizure is severe, the current is decreased. Since more respiratory difficulty is encountered when the time is lengthened, it seldom goes beyond 0.2 second. In a few cases, however, it has become necessary to give 650 milliamperes for 0.5 second in order to induce convulsions. Even then, a convulsion did not always follow the shock.

To some extent, the severity of the convulsion can be regulated by the strength of the current and the length of time it is applied. This is not always possible. The same patient may show considerable variation from time to time. A given dose which one day produced a grand mal attack may a couple of days later cause only a petit mal reaction. The author has observed no tendency toward lowering of the convulsive threshold after repeated treatments.

Microscopic Demonstration of Fat in Urine and Stool by Means of Fluorescence Microscopy. Bruno W. Volk, and Hans Popper.

Am. J. Clin. Path. **14**:238 (April) 1944.

Demonstration of fat in urine and feces is of diagnostic importance. Fat droplets in feces indicate faulty digestion and absorption of fats as seen in insufficiency of external pancreatic secretion or in disturbance of bile secretion. Doubly refractile lipoids in urine indicate pathologic permeability of the glomeruli for lipods as seen chiefly in nephrotic conditions.

The presence of fat droplets in urine has had much less attention mainly because of the more complicated procedure involved. Gershenfeld, stated that alimentary lipuria occurs in normal persons after high fat diet or intake of extensive quantities of olive oil, cod liver oil and the like. In abnormal conditions as lipoid nephrosis, diabetes mellitus, traumatism resulting in injury to the bone marrow, phosphorus poisoning and where fatty degeneration of leukocytes occurs, lipuria may be present. Scuderi did not find any fat in a large series of human urines examined with Sudan III.

With the use of Sudan III, alcohol used as a menstruum dissolves some of the fat and the staining is not distinct. Therefore, it seemed promising to use the water soluble fluorescent fat stain Phosphin 3R for demonstration of neutral fats under the fluorescence microscope. Phosphin 3R has so far been used in tissues. In the following, a method for demonstration of neutral fats in urine and feces with Phosphin 3R is described and observations on a series of specimens are reported.

Electricity as a Pathogenetic Agent in the Central Nervous System. Mortimer Ostow.

J. Nerv. Ment. Dis. **99**:277 (March) 1944.

In the central nervous system, potential gradients of the order of one-tenth of a volt per centimeter occur normally. These gradients may be significantly increased by cooling or by application of strychnine or tetanus toxin and probably under other conditions. White matter and tissue in the vicinity of the various boundaries of the central nervous system are most susceptible to injury by intrinsically originating electrical fields. Irreversible damage may be induced in nervous tissue by the application of potential gradients of the order of one or two volts per centimeter. Even smaller gradients evoke vascular spasm. Progression of certain lesions of the central nervous system after disappearance of the etiologic agent and certain observations concerning multiple sclerosis and tetanus, as well as central nervous system lesions observed in hypothermia, are consistent with injury by intrinsically originating electrical fields. Electrical field strengths observed in the central nervous system are of the same order of magnitude as those required to damage nervous tissue and so may be considered potentially pathogenic.

Peripheral Vascular Disease and Industry. A. Wilbur Duryee.

West Virginia M. J. **40**:6 (Jan.) 1944.

In the treatment of peripheral vascular diseases several general principles of therapy should be stressed. Heat should be used in two forms. Environmental temperature should be low enough to reduce the metabolic process to a point where tissues can survive with the blood supply available. In severe injuries this may mean a temperature of between 50 and 60 F. Temperatures above that of body temperature may be applied to the trunk by contact, irradiation, or electrical energy in order to promote reflex peripheral vasodilatation. Other methods of raising body temperature, such as intravenous typhoid vaccine therapy, will accomplish the same result provided excessive dosage is avoided and chills are eliminated. Various drugs are mentioned but their importance in treatment is of a minor degree. Nitrites, xanthines, papaverine, cholines, salicylates and alcohol all have advocates. None is outstanding in its effect. Hypertonic saline has been demonstrated to increase blood volume and peripheral pulsations. Mechanical appliances, such as the oscillating bed, intermittent venous occlusion and the suction pressure boot, when used by the experienced, may be of value but their availability is limited and their use must be directed by one skilled in their application. Of all methods so far advocated the oscillating bed is perhaps the most sound in principle, the easiest of application and the most satisfactory. Even this simple modification of the postural exercise principle can do harm. If the period of elevation is too prolonged or too high, increased ischemia to the tissue results, pain increases and gangrene extends.

The Principles of Re-Education in Breathing. Basil Kiernander, and Lilian B. Pollard.

Brit. J. Phys. Med. **7**:39 (March-April) 1944.

Although breathing is a vital function of the body it is uncommon to find that the mechanism provided for that purpose is used to its fullest extent. Like most body mechanisms, the respiratory apparatus works best with the animal in the four-footed position. When man adopted the upright posture, this apparatus came into conflict with the force of gravity and for this it is ill-fitted. The result is apparently in the faulty, incomplete respiration of the so-called normal individual. Even a group of young recruits for the Forces provides comparatively few examples of a habitually full easy respiration. That is to say, in most cases the vital capacity (the maximum intake of oxygen and the maximum output of carbon dioxide) is reduced, with a corresponding impairment of all bodily functions. It is not too much to claim that, in the absence of any organic disease, the inspiring outlook of those who are "on top of their form" can only be acquired when the posture is balanced and the respiratory mechanism is functioning to its maximum.

In giving instruction in breathing exercises it is necessary to remember that several deep res-

pirations will disturb the carbon dioxide content of the blood on which the respiratory control so largely depends. It is wise, therefore, to intersperse the deep respirations with the mobility and abdominal exercises so that a further supply of carbon dioxide is forthcoming and the balance maintained.

Recruitment of Mammalian Nerve Fibers. A. Rosenblueth.

Am. J. Physiol. **141**:204 (April 1) 1944.

Recruitment, a progressive increase of the number of nerve fibers stimulated by a strain of submaximal test shocks, was studied in the circulated peroneal nerve of cats under dial anesthesia after injections of veratrine.

The process which underlines recruitment after veratrine can be long enduring. The time course of this process is not parallel with that of the negative after potential.

Recruitment is uninfluenced by changes in the site of stimulation of a nerve in the course of atrain of stimuli. It is elicited, therefore, by the responses, not necessarily by local effects of the stimuli.

Recruitment is promoted by single shock stimulation of the same or other fibers in the nerve than those tested. The influence of the untested fibers shows the importance of interaction of the several elements in a nerve trunk for the development of recruitment.

It is suggested that recruitment is due to several factors, random changes of threshold (Gasser, 1938); local subthreshold changes of excitability (Gasser, 1938); and interaction exerted by the release of a chemical agent, probably K ions, by the active fibers. After injections of veratrine the factor of interaction is the most prominent.

Environmental Temperature and Vitamin K Deficiency. C. A. Mills; Esther Cottingham, and Marjorie Mills.

Am. J. Physiol. **141**:362 (May 1) 1944.

Severe and highly fatal vitamin K deficiency can be produced in rats adapted to tropical heat by using K-free synthetic diets containing 0.5 per cent sulfaguanidine. This deficiency is most severe and fatal early in the third week of such feeding and disappears almost entirely by the fifth week. Animals adapted to tropical heat seem definitely more prone to severe manifestations of K deficiency than do those kept in temperate coolness, and the K requirement per gram of food is twice as high for rats in the heat as for those in the cold.

A preliminary survey of hospital statistics on bleeding in the new-born shows this type of human K deficiency to be 4 times more prevalent among infants born in the Gulf States than among the northern-born. Fatal hemorrhages in male rats on K-free diets are especially prone to occur in the genital system and around the superior mesenteric vein.

Rehabilitation of the War Wounded in the Soviet Union. A. N. Sukhov.

Am. Rev. Soviet Med. **1**:293 (April 1) 1944.

The constitution of the U. S. S. R. grants every citizen the inalienable right to security in old age and during illness or disability. Under these provisions the war wounded who cannot be returned to the front are granted pensions not only for themselves but also for their families. The law divides veterans into three categories: Totally handicapped persons who require hospitalization; totally handicapped persons who do not require hospitalization; persons rendered unfit for their former occupations but capable of easier work with a shorter working day. Pensions are also graduated to conform with rank. A Medical-Labor Commission consisting of medical specialists and trade union representatives functions in every hospital, reviews and certifies each case.

The Gastric Emptying Time of Man at High and Normal Environmental Temperatures. Austin Henschel; Henry Longstreet Taylor, and Ancel Keyes.

Am. J. Physiol. **141**:208 (April 1) 1944.

Gastric emptying times were observed on 17 normal young men in rest at environmental temperatures of 77 F. and 120 F. In all but one of the subjects the gastric emptying time was faster at the high temperatures. Twelve of the subjects had an average decrease of 30 per cent in the gastric emptying time when the temperature was 120 F. Observations on about 100 normal men doing hard work at 120 F. failed to indicate any lack of appetite or any signs of decreased gastric activity except in actual heat exhaustion.

Rehabilitation; With Special Reference to Occupational Therapy. Andrew Shepherd.

Brit. J. Phys. Med. **7**:44 (March-April) 1944.

Rehabilitation has come into the forefront recently. It is because the acute need for workers in wartime has made something evident to which most were blind in the days of peace. It has been shown that the angle of vision must be enlarged to take in the whole individual, both his physical and his mental self, and that from the beginning the limbs, systems and other parts of the patient that are uninjured must be kept as nearly normal as is possible; none of these should become "softened" by "neglect" or disuse while concentrating efforts and the mind of the patient on the particular limb that has been injured. This fact was again brought home to the author when an army officer who visiting the hospital early in 1942 complimented on the treatment of the actual injuries but complained that the men, on being returned to their units "recovered" after a period of three or six months in hospital, were found to be "soft," and that some months had to be spent "hardening" them; (re-hardening would be the truer word, for when a man was admitted to hospital, whereas one limb

was far from being 100 per cent fit, the remainder of his body was undeniably 100 per cent). The visiting officer pointed out that this "hardening" was both a painful and an unnecessary process.

In peace-time it did not seem to matter very much whether a patient after an injury spent some months attending out-patient departments, unemployed and slowly becoming more and more chronically invalided; it was a great pity, a strain on the department, on the National Health Insurance and on club money but it was regarded as an unavoidable result of the accident. Present wartime needs have stimulated vision and forced those concerned to elaborate a splendid medical wartime reconstruction to which has been given the name, rehabilitation. This is not an entirely new outlook in all spheres but the rapid spread of rehabilitation to each and every hospital clearly is new and is full of hope for the future.

Occupational therapy has many functions to perform and does not escape criticism. Never should it be regarded as "just something to occupy the mind" or as "the making of dog-leads or baskets." "Dog-leads and baskets" are certainly not the beginning and the end of occupational therapy. Some critics appear to believe that occupational therapy is attempting to usurp the rights of more established forms of therapy; this is far from the truth. Occupational therapy has taken over the exploration of new fields, has utilized new methods and established its successes many times over.

The Problems and Principles of the Restoration of Limb Function Following Injury, as Demonstrated by Humeral Shaft Fractures. F. S. A. Doran.

Brit. J. Surg. **26**:367 (April) 1944.

How the modern conception of the restoration of limb function following a fracture is regarded as a struggle between the power of the musculature and the strength of limiting adhesions is presented. The causes of post-traumatic joint stiffness are outlined. An analysis is made of the recovery of elbow-joint mobility in 76 cases of fractures of the humeral shaft, uncomplicated by nerve injury or multiple injuries in the same limb. It is shown that the recovery of joint movement is determined by the site of the fracture, and its manner of production. All those cases in which the full range of elbow movement was attained did so in eight weeks or less, irrespective of all the modifying factors. It is shown that fractures due to flying accidents take much longer to unite than those due to non-flying accidents. An analysis of the recovery of muscle power in injured upper limbs shows that the patients are frequently discharged from the rehabilitation centers with a recovery of less than 40 per cent of normal power, even when a full range of elbow movement is present. A "norm" is constructed for elbow flexors from the measurements of 76 patients without any upper limb injury and a chart is given showing the degree of muscle weakness to be expected. An analysis of the current free-swinging type of remedial exercise reveals that it is based on the Danish system of gymnastics designed to improve bodily form, and unconnected with the problems of post-traumatic joint stiffness and muscular weakness. Remedial games are shown to be invaluable in the later stages of recovery, but unsuitable for the early stages.

Roux's theory of muscular adaptation when applied to the clinical material is reported to be true. The restoration of power is shown to be rapid and simple with resistance exercises. An analysis of the relation of muscle power to joint mobility is made. It is shown that the power can be restored to normal if a total of 70 degrees of elbow movement is present, irrespective of fracture sites. The mental aspect of rehabilitation is considered to be outside the scope of the report, but it is pointed out that the measures needed to restore muscular power do not predispose to mental morbidity.

The Rocker Walking Iron. G. E. Foster.

Brit. M. J. **4347**:592 (April 29) 1944.

Reference is made to rocker walking iron described by Major T. T. Stamm in the *British Medical Journal* (July 3, 1943). The author has used with satisfaction, a different type, which is described: An iron strap, 30 by 1 by ⅛ inches to 3/16 inch, is bent to shape. The rocker surface is covered to prevent slipping. A piece of old bicycle tire is suitable and may be laced on, or a leather strap may be riveted on. An unpadded plaster cast is applied in the usual way. The posterior slab should be substantial (15 to 18) layers. When the cast has hardened, a single plaster bandage suffices to secure the iron. The well foot should be fitted with a built-up wooden sole screwed on to a canvas shoe in order to equalize the leg length.

The rocker, as stated by Major Stamm, unquestionably "ensures a natural heel-toe action in walking." The type described by the author needs no bolting to a sole plate and the long upright part distributes the weight over more of the cast as well as stabilizing the rocker. The appliance remains firm and secure after several weeks service and the same iron may be used repeatedly. The built-up sole on the well foot greatly facilitates walking. This particular rocker iron has been used in the United States and Canada for several years.

Rehabilitation of Heart Cases.

Brit. M. J. **4346**:565 (April 22) 1944.

The memorandum on the rehabilitation of cardiac patients has been approved by the Council of the Cardiac Society of Great Britain and Ireland. It is signed by the chairman, Sir Maurice Cassidy and the secretary, Dr. Maurice Campbell.

Many patients, those with fractures for example, derive great help from efficient rehabilitation. Without it they may be handicapped for long periods; with it most of them may be enabled to undertake full activities and to resume their normal work. The success achieved in this direction

has led to the suggestion that similar methods should be used more widely, and the Council of the Cardiac Society felt the time was opportune for expressing their views and bringing forward some questions for wider discussion.

In their opinion there is only limited scope for rehabilitation, for patients suffering from organic cardiovascular disease. Physical therapy and graduated exercise are useful but must be supervised by a physician with special knowledge of heart disease. The main problem is the decision as to how much general activity should be allowed which depends more on the success of the physician in charge in diagnosis and assessment of the patient's cardiac reserve than on the availability of skilled assistants in physical or occupational therapy. The need for suitable convalescent homes is recognized.

There is need for rehabilitation in cases of effort syndrome, which are as common in civil life as under service conditions, though here it may appear diagnosed as "cardiac anxiety state," "traumatic neurasthenia," or "post-influenzal tachycardia." It is suggested that the rehabilitation of patients, whether by graduated exercises or by simple psychotherapy, should not be carried out at cardiac clinics, once it has been decided that there is no organic disease.

Fatalities Associated With Electric Shock Treatment of Psychoses. Alexander Gralnick.

Arch. Neurol. & Psychiat. **51**:402 (April) 1944.

Of 2 patients whose deaths were associated with electric shock treatment, the first died in a hyperpyretic state associated with status epilepticus one week after the fourteenth treatment. The second patient died two days after the second treatment. Autopsy in the second case disclosed evidence of cerebrovascular syphilis and other changes which were possibly due to the treatment itself. However, the alterations were not sufficient to account for death. A review of some of the pertinent literature indicates that the cause of death after electric shock treatment is still obscure. Selection of patients for treatment should not be indiscriminate, especially in the face of an unpromising prognosis. Electric treatment has attendant serious dangers and should not be given to patients with a history of vascular or cerebral disease.

Electric Shock Therapy in a General Hospital. Thomas Johannes Heldt; Daniel David Hurst, and Nicholas Peter Dallis.

Arch. Int. Med. **73**:340 (April) 1944.

General hospitals with neuropsychiatric facilities can utilize electric shock therapy to advantage. In a general hospital of six hundred beds 100 patients were successfully treated over a period of eleven months.

Electric shock therapy has largely replaced metrazol convulsive therapy. It appears to be almost a specific therapy in the treatment of the depressions whether they are endogenous, involutional or reactive or depressions with mixed components. The therapy is not of great value for schizophrenia, although it does seem to make many of the patients more manageable. Its use for the manic-depressive psychoses is primarily to facilitate management. The use of this therapy for frequent recurrences of this psychosis is questionable. For the psychoneuroses the results are rather discouraging, probably because the underlying determinant must be removed to relieve the psychoneurotic state properly; electric shock is judged to be of some benefit in facilitating the psychotherapeutic approach.

Curare was used routinely in the treatment of our 100 patients. The only serious complication was compression fracture of the thoracic portion of the spine. This occurred in only 2 cases, and in 1 of these the fracture occurred when the curare was unwittingly omitted after it had been used in earlier administrations.

Physical Medicine in Ophthalmic Treatments. Nellie I. Lanckenau.

Brit. J. Phys. Med. **7**:48 (March-April) 1944.

Physical medicine has a definite place in the treatment of certain ophthalmic conditions and diseases. There are many varieties of physical treatment which can be used for diseases of the eye and in this article the author describes a few of the methods employed.

Diathermy is particularly effective in subacute glaucoma. Athermic short-wave therapy is useful in painful infective conditions. General and local ultraviolet light is beneficial with or without short wave treatment. The patient as a whole must be considered from the point of view of exercise and occupational therapy.

Treatment of Acute Knee Injuries. With Special Attention to the "Weak Knee" Syndrome. Chalmers R. Carr.

U. S. Nav. M. Bull. **62**:796 (April) 1944.

Knee joint disability during naval service, exclusive of combat injuries and fractures, is frequently encountered. The anatomy and recent concepts of the mechanics of the knee joint are reviewed, with particular reference to the "weak knee" syndrome. A program for conservative management of the acute traumatic knee, which we believe will prevent disabling "weak knee" following injury, is outlined.

Quick Cure for Syphilis?

Lancet **6287**:281 (Feb. 26) 1944.

For some years after Ehrlich introduced "606" in 1910 it was believed that syphilis could be cured by a few injections of the drug given over a short period. This view was still held in the last war, but it slowly came to be realized that a negative Wassermann reaction and healing of visible lesions did not always mean cure; there-

after, though intensive treatment still had its vogues, a long course of weekly injections of some arsenical compound, together with mercury and later a bismuth preparation, because the standard treatment of early syphilis. In the present war intensive treatment has returned to favor in the United States and on a small scale in England. Its obvious advantage, rapid control of infection, saving of the patient's time and elimination of the interruptions in treatment that may arise from the patient's default or other circumstances, are particularly worth while in time of war. These must be weighed against its inconvenience to the patient and the added risk of toxic reactions.

It is not recommended to use intensive arsenotherapy as part of the routine treatment of syphilis in British soldiers.

Rehabilitation Program for Blind and Deafened — Hillman

(*Continued from page 481*)

6. Hard of hearing servicemen are salvageable for many types of specialized duty.

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Trench Foot — Berson and Angelucci

(*Continued from page 487*)

gency. Therapy should be applied by the first medical officer who sees the patient and his evacuation should be considered only after early treatment has been fully exploited or evacuation can be accomplished without interruption of therapy.

Suggestions for early treatment:

1. Remove all potentially constricting clothing and shoes.
2. Prohibition of walking or weight bearing on the feet.
3. Immediate application of cooling by the most efficient method at hand, and the continuation of such cooling until its slow withdrawal does not result in the feet becoming noticeably warmer than the rest of the body.
4. Strict avoidance of all warming agents (clothing, dressing hot water bottles, stoves, etc.).
5. Strict prohibition of all massage.
6. Avoidance of sympathetic block at this early stage.